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Vol. XVII, No. 7 JULY, 1928

JOURNAL
OF THE
AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

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Published Monthly by the American Pharmaceutical Association: Office of publication, 20th & Northampton Sts., Easton, Pa. Editorial Office, 10 West Chase Street, Baltimore, Md.

Annual Subscription, $4.00; Single Numbers 35 Cents.

THE SEVENTY-SIXTH ANNUAL CONVENTION WILL BE HELD AT PORTLAND, ME., DURING WEEK OF AUGUST 20, 1928.

The 1928 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conferences of Pharmaceutical Association Secretaries will also be held at Portland, same time and place.

For Association Roster and Roster of the Boards of Pharmacy, of Officers of Pharmaceutical Associations, Local Branches, see pages x, xii, xiv, etc.

Entered as second-class Matter, January 23, 1917, at the Post Office at Easton, Pa., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103. Act of October 3, 1917; authorized July 10, 1918.

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The Kappa Psi Fraternity, Annual Meeting, week of August 13th in Eastland Hotel, Portland, Me.

The National Conference of Pharmaceutical Research, Eastland Hotel, Portland, Me., August 18th.

The Symposium on Genus Mentha, during week of August 20th, in Eastland Hotel, Portland, Me.

The Conference of Pharmaceutical Association Secretaries, Eastland Hotel, Portland, Me., during week of August 20th.

The American Association of Colleges of Pharmacy, in Eastland Hotel, Portland, Me., August 20th and 21st.

The National Association of Boards of Pharmacy, in Eastland Hotel, Portland, Me., August 20th and 21st.

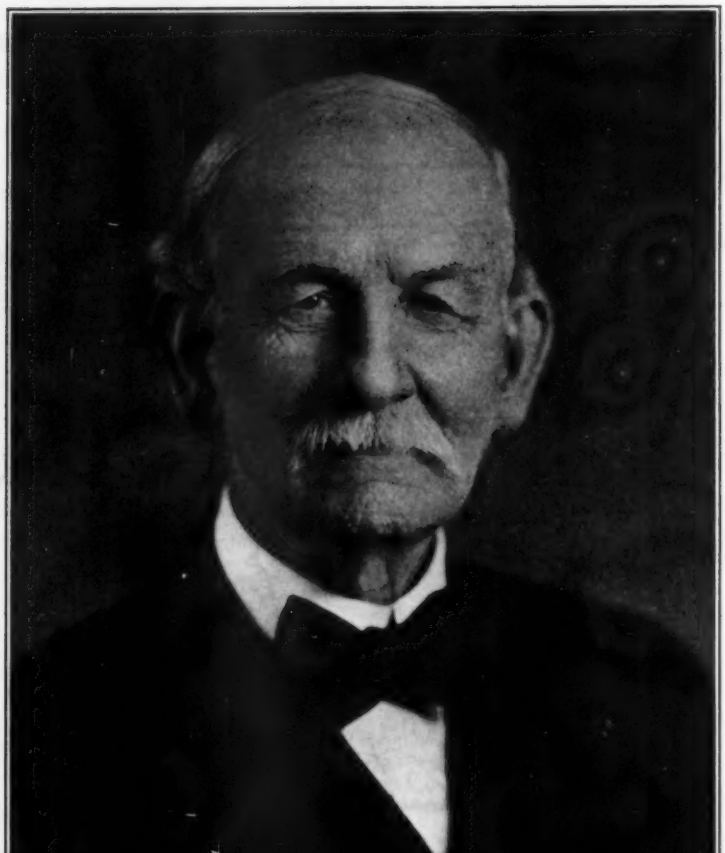
The AMERICAN PHARMACEUTICAL ASSOCIATION, in Eastland Hotel, Portland, Me., during the week of August 20th.

For programs see under "Societies and Colleges" in last reading section of this issue.

Maine—the "Land of Remembered Vacations."

For the convenience of those wishing to know the distances between the principal points in Maine, we give above the mileage distances which appear on the official State highway map. Those planning to make a motor tour of the State should send to INFORMATION BUREAU, *Secretary of State*, Augusta, Maine, for "Maine by Motor," which includes a highway map and gives a series of attractive tours through the state, and shows all trunk line routes into Maine. The Local Committee is sending out an invitation to you with information as to program, routes, rates, etc. Those desiring to make the trip by water can secure information from the nearest agent, but do not delay as most steamship lines are sold out several weeks ahead.

Purchase your tickets on the Certificate Plan—which means one-half rate on the return ticket—provided 250 tickets are validated. Your saving may only be small but you will help members coming from a distance. Those going from Boston (Plant Seminar) to Portland should bear in mind this opportunity to help the former.



WILBUR FISK HORN.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XVII JULY, 1928 No. 7

WILBUR FISK HORN.

Wilbur Fisk Horn of Carlisle, Pa., became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1876 and in the succeeding year aided in the organization of the Pennsylvania Pharmaceutical Association. He is the only surviving charter member of the latter organization.

Mr. Horn was born and reared in Philadelphia, where he received his earlier education in the public and private schools; later, he worked in wholesale and retail drug stores of the city. When about twenty years of age he entered Dickinson College, at Carlisle, where he earned the A.B. and A.M. degrees. His Alma Mater offered him an adjunct position in Chemistry, but he declined the offer and returned to Philadelphia where he accepted a position in the laboratory established by the Iron Masters. Thereafter, he returned to Carlisle and engaged in the drug business, with analytical chemistry as a side line. Mr. Horn writes that he has been fairly successful during more than a half century without stocking merchandise which would have interfered with his studies that have given him profit, edification and enjoyment—physics and chemistry. He has continued the good work and contemplates writing a paper which will, in a way, supplement the one read at the December 1927 meeting of the American Association for the Advancement of Science, on "Some Observations and Reflections on Energy." In this paper the author discusses the physics of energy, its manifestations, etc., and presents his reasoning and scientific observation on which his conclusions are based.

Some of Mr. Horn's earlier contributions to pharmaceutical literature relate to the catalytic action of iodine in the manufacture of phosphoric acid, the discoloration of Syrup of Ferrous Iodide, Solution of Sodium Phosphate, Solution of Magnesium Citrate, etc.

The veteran member maintains an interest in current events, particularly those which relate to the sciences that have engaged his attention for the past fifty years or more; he is not only the oldest living member of his State Association but also the senior Pennsylvania member of the AMERICAN PHARMACEUTICAL ASSOCIATION.

EDITORIAL

E. G. EBERLE, EDITOR 10 West Chase St., BALTIMORE, MD.

THE COMPETITION OF PRIVATE ENTERPRISE.

IN AN address by President Coolidge before the 37th Continental Congress of the D. A. R., in Washington, on April 16th, he presented a number of thoughts which are applicable to present developments in business, and in this comment his words are applied to conditions which obtain in the drug business. There are advantages in the system of chains, but all sides of the question are not given due consideration when only its advantages are discerned, for the fundamental characteristics are not going to be changed for the better by substituting corporation management for private enterprise. The individual who manages the one, with all his imperfections and his selfishness, will have to be employed to manage the other, and when out of view and out of contact with the patrons his actions are not guided and guarded by the same motives. His aim above everything else is to make money—outside investors in the enterprise expect profit—few of them think of anything else as a result of their investment.

President Coolidge, in pointing out some of the dangers of Government ownership said:

"The very essence of business is the expectation of a profit on the part of those who conduct it. Government is conducted from an entirely different motive. When business is in private hands, it is expected to be run for the benefit of the owners. When the Government steps in, the purchasers, users, and beneficiaries of what the Government undertakes to supply insist that the concern should be conducted for their benefit. It does not eliminate selfishness; it simply transfers it in part from the seller to the purchaser. Under these conditions it ceases to be a real business, becomes lacking in enterprise and initiative, and does not have any motive to provide improved service.

"Flowing out of these unavoidable conditions, if the Government gets into business on any large scale, we soon find that the beneficiaries attempt to play a large part in the control. While in theory it is to serve the public, in practice it will be very largely serving private interests. It comes to be regarded as a species of Government favor and those who are the most adroit get the larger part of it. Men in public life are besought to secure places of employment for some persons in their locality and favorable contracts for others.

"The situation rapidly develops into a position of intrenched selfishness, where a great body of public employees and large outside interests are in virtual control, with the general public paying a high cost for poor service. With all the care that it is possible to exercise, a situation of this kind becomes entangled in favoritism and is always in great danger of causing corruption and scandal.

"If it is desirable to protect the people in their freedom and independence, if it is desirable to avoid the blighting effects of monopoly supported by the money of the taxpayer, if it is desirable to prevent the existence of a privileged class, if it is desirable to shield public officials from the influence of propaganda and the acute pressure of intrenched selfishness, if it is desirable to keep the Government un-

encumbered and clean, with an eye single to public service, we shall leave the conduct of our private business with the individual, where it belongs, and not undertake to unload it on the Government."

The thoughts expressed by the President can easily be read into an address on the dangers of large combinations, which ultimately seek to control the contributory activities and make them serve as adjuncts. Eventually, the public will recognize the dangers of a system it has encouraged because of present advantages, for there is danger in delegating action to a few men or corporations and placing the power of vast investments under the direction of a few because of their outstanding abilities in organization, leadership and finance.

The trend of the times is recognized and it is not intended to blame any who follow it, nor charge them with questionable motives, but thought should be given to both sides of a great movement, the influences of which will affect every individual. If the chain system is to be permanent and is deemed best for the people, the business and the profession, then the conduct should be so regulated that mercenary and selfish motives will not be in absolute control. If a separation of pharmacy and the drug business is to result, let careful thought be given so that the change will be for the greatest good for the greater number and best service for the public. The aim of the comment is to be helpful and encourage thoughtful consideration.

UNITED STATES PHARMACOPŒIAL CONVENTION EXHIBIT AT THE MINNEAPOLIS MEETING OF THE AMERICAN MEDICAL ASSOCIATION.

WE ARE in receipt of a report of the pharmacopœial exhibit made by the College of Pharmacy of the University of Minnesota. This is the fourth time that such exhibits have been made during the annual meetings of the American Medical Association. The first of these exhibits was prepared under the auspices of the Philadelphia Branch of the A. PH. A. and direction of Chairman E. Fullerton Cook; the second, at Dallas, under direction of Dean C. A. Duncan of Baylor University College of Pharmacy. The third, at Washington, was a joint exhibition of the Hygienic Laboratory with coöperation of S. L. Hilton and E. Fullerton Cook. The report of the Minneapolis Exhibit follows:

"The College of Pharmacy of the University of Minnesota participated very successfully in the American Medical Association Scientific Exhibit at the Minneapolis Auditorium during the entire week beginning June 11th. The College exhibited for and under the auspices of the Board of Trustees of the U. S. Pharmacopœial Convention, and the exhibit accordingly illustrated pharmacopœial and dispensing pharmacy particularly but also pharmaceutical chemistry and pharmacognosy, including medicinal plant culture. Because of the artistic arrangement of the display, which was enhanced by an array of medicinal plants and by the oil portraits of William Procter, Jr., the first professor of Pharmacy in America; of Edward Parrish, the author of the first American textbook of Pharmacy and of Samuel W. Melendy, one of the fathers of early Minnesota pharmacy, the exhibit aroused considerable and continuous attention of the many visitors.

"The exhibit included principally plants in various stages of cultivation; a complete prescription department with practical illustrations of proper methods of

dispensing and examples of avoidance of incompatibility in dispensing; a series of medicinal inorganic and organic salts prepared by students; samples of practically all classes of medicinal preparations including plain and coated pills, compressed and triturated tablets, hard and soft liquid and massed capsules, powders, suppositories, bougies, granulated and effervescent salts, cachets and other preparations; illustrations of various pharmaceutical methods and procedure incident to general practice; illustrations of various inorganic and organic analytical and assay methods; demonstrations with polariscope, colorimeter, refractometer, analytical and dispensing balances and other scientific instruments of precision, including binoculars illustrating pharmacognostic microscopy; old United States and European pharmacopœias; an entire set of AMERICAN PHARMACEUTICAL ASSOCIATION PROCEEDINGS and YEAR BOOK, important current pharmaceutical text and reference books and other books.

Exhibit of the U. S. Pharmacopoeial Convention at the
Minneapolis meeting of the American Medical Association,
prepared and conducted by the College of Pharmacy of the
University of Minnesota.
A "Special Certificate of Merit" was awarded to the College
for the "Best Exhibit in the Educational Classification".

"The Minnesota State Pharmaceutical and the Minneapolis Veteran Druggists' Associations joined in having Dean Wulling's address to the Hennepin County Medical Society reprinted and distributed at the booth. Fifteen hundred copies were distributed.

"While Dean Wulling was responsible to the A. M. A. Scientific Exhibit Committee, he turned over the preparation and conduct of the exhibit to a Committee consisting of Professors G. Bachman, *Chairman*, E. B. Fischer, C. H. Rogers and C. V. Netz. The success of the exhibit was due largely to the good work of Professors Bachman and Fischer who were ably assisted by Instructors Netz, Almin, Peterson, Smyithe, Turner and Assistant Kroning, with Messrs. Raymond Callander and Otto Pederson assisting in other ways.

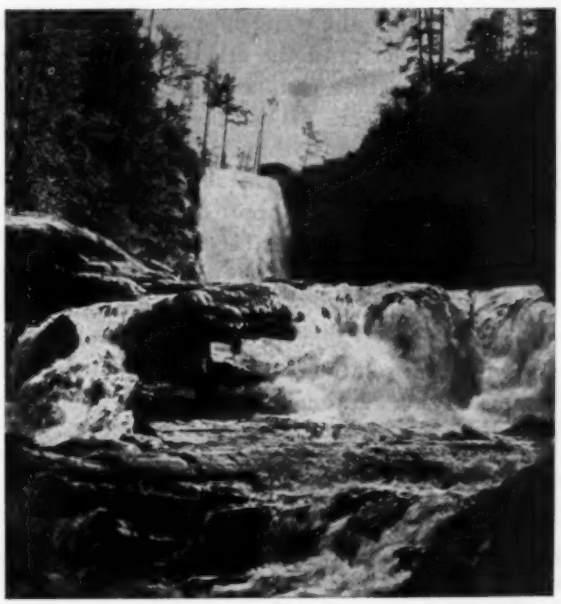
"The excellence and attractiveness of the exhibit and the practical demonstrations and the emphasis of the attendants upon particularly the Pharmacopœia and pharmacopœial pharmacy were recognized by the Committee on Award by awarding the College a 'Special Certificate of Merit for the Best Exhibit in the Educational Classification.' "

The exhibit booth was furnished by the American Medical Association. It was a double booth and included 210 square feet of floor space and more of wall space.

TERM "ANTISEPTIC" EXPLAINED UNDER FEDERAL FOOD AND DRUGS ACT.

AN INVESTIGATION has been made by the Food, Drug and Insecticide Administration of the United States Department of Agriculture of those drug products on the market which are described as antiseptics. In order to answer numerous inquiries from the trade as to the propriety under the Federal Food and Drugs Act of designating these articles "antiseptic," the Administration has issued the following statement:

Current dictionaries give two meanings for the word "antiseptic." According to these authorities an antiseptic may either kill bacteria or prevent their growth. Products such as salves, ointments and dressings, which remain in contact with the body for long periods of time, may properly be designated as antiseptics if they inhibit the growth of bacteria. On the other hand, mouth washes, douches, gargles, and preparations of like nature, which are in contact with the body for but brief periods of time, and because of this cannot exert any inhibitory action, may properly be described as antiseptics only if they will destroy bacteria under the conditions of use; that is, in the dilutions recommended, and in a period of time comparable to that in which they would have an opportunity to act when used as directed.



Moxie Falls.

SCIENTIFIC SECTION

ANALYSIS OF GINGER AND ITS PREPARATIONS.*

BY J. F. CLEVENGER.**

Examination in the Pharmacognosy Laboratory of many samples of fluidextract of ginger and ginger rhizomes found on the market showed that these products were often adulterated or inferior. As the Pharmacopœia contains no assay or standard for ginger and its preparations, a study was undertaken to develop one that would be acceptable to the trade and drug control officials alike.

METHOD OF ANALYSIS.

The following method of analysis was used in the study:

Place 50 cc. of fluidextract of ginger or the ether extract from 50 Gm. of moderately coarsely ground ginger rhizomes obtained with a continuous extractor[1] into a 100-cc. round-bottom flask and evaporate the alcohol, if fluidextract has been used, or the ether, if the ether extract of the rhizomes has been used, on a slowly simmering steam-bath until the odor of the solvent is no longer detected. Add 50 cc. of water to this residue and determine the amount of the volatile oil present, using the special apparatus described by Clevenger.[2] The number of cubic centimeters of volatile oil obtained multiplied by 2 gives the percentage of volatile oil. Finally, the volatile oil may be transferred to a test-tube (10 x 75 mm.) and allowed to stand until perfectly clear. (Over night is usually sufficient.) The specific gravity, the index of refraction and the optical rotation of the volatile oil thus obtained may be determined by the methods outlined.[2]

After extraction of the volatile oil, allow the flask containing the water and non-volatile residue to cool. When most of the non-volatile residue has settled to the bottom of the flask decant the water into a suitable separatory funnel and shake out repreatedly with ether until the ether solution is practically free from color. Extract the residue with ether, combine the ether extracts and filter through a dry filter paper into a tared beaker. Wash the filter paper with ether. Evaporate the solution to dryness on a steam-bath, using a current of air. Place the beaker containing the non-volatile ether-soluble extractive in a vacuum desiccator containing sulphuric acid. Let it stay for approximately 2 hours and then weigh. The non-volatile ether-soluble extractive, here designated G, is considered the active constituent of ginger. The weight in Gm. multiplied by 2 gives the percentage of G. Dissolve G in neutral 95% alcohol and make up to volume, so that 10 cc. contains approximately 0.5 Gm. of non-volatile ether-soluble extractive, using care to obtain a uniform solution. Determine the iodine and saponification values on 10-cc. portions of this solution by the following modifications of the U. S. Pharmacopœia methods.

---

* Scientific Section, A. PH. A., St. Louis meeting, 1927.

** Pharmacognosy Laboratory, Drug Control, Food, Drug and Insecticide Administration, Washington, D. C.

[1] Palkin, Murray and Watkins Automatic Extractor, Type B, *Ind. Eng. Chem.*, 17 (1925), 612, is satisfactory for this purpose.

[2] Clevenger, JOUR. A. PH. A., 17 (1928), 345.

IODINE VALUE.

Transfer 10 cc. of the alcoholic solution into a glass-stoppered 250-cc. bottle and evaporate to dryness on the steam-bath, using air current. Dissolve the residue in 10 cc. of chloroform. Add 15 cc. of iodobromide T. S. (U. S. P. X, page 489) measured from a burette. Stopper the bottle securely and allow the mixture to stand for half an hour in a cool dark place. Shake the mixture at 10-minute intervals. Then add, in the order named, 20 cc. of potassium iodide T. S., 75 cc. of distilled water, and tenth-normal thiosulphate in small successive portions, shaking thoroughly after each addition, until the color of the upper layer becomes pale. In order to recognize the approach of the end-point between successive shakings it is necessary to allow the mixture to stand until the layers are completely separated. Now add a few drops of starch T. S. and continue the addition of tenth-normal sodium thiosulphate until the blue color disappears.

Make a blank test by mixing exactly the same quantities of reagent and titrate the free iodine with tenth-normal sodium thiosulphate as directed above. The difference in the number of cubic centimeters of tenth-normal sodium thiosulphate consumed by the blank test and the actual test, multiplied by 1.269 and divided by the weight of G taken, gives the iodine value.

SAPONIFICATION VALUE.

Transfer 10 cc. of the alcoholic solution into an Erlenmeyer flask of approximately 200-cc. capacity, and add 10 cc. of alcoholic half-normal potassium hydroxide (U. S. P. X, page 501). Insert into the neck of the flask, by means of a perforated stopper, a glass tube from 70 to 80 centimeters in length and from 5 to 8 millimeters in diameter, and heat the flask on a water-bath for half an hour, frequently rotating the contents. Then add 2 cc. of phenolphthalein T. S. and titrate the excess of potassium hydroxide with half-normal hydrochloric acid. The natural color of solution G interferes with the determination of the true end-point, because the red color of the phenolphthalein grades off imperceptibly into the brown of G. The natural color of G varies, depending primarily upon the variety of ginger used. There are two distinct color changes during the titration, first when the red of the phenolphthalein disappears and second a change from dark brown to light brown. The end-point as determined by electrometric titration is indicated by the change from dark brown to light brown. It has been observed that under the conditions of the experiment the addition of approximately 0.4 cc. of alcoholic half-normal potassium hydroxide is necessary after the red of the phenolphthalein has disappeared.

Make a blank test, using exactly the same amount of alcoholic half-normal potassium hydroxide. The difference in the number of cubic centimeters of half-normal hydrochloric acid consumed in the actual test and in the blank, multiplied by 28.06 and divided by the weight of G taken, gives the saponification value.

It is generally accepted that the fluidextract of ginger contains the active constituents of the drug. Fluidextracts prepared by the U. S. P. method and ether extracts prepared in a continuous extraction apparatus were made from several specimens of moderately coarsely ground ginger rhizomes. The results obtained from analyses of these extracts are given in Table I.

TABLE I.—ANALYSIS OF GINGER EXTRACTS.

Ginger rhizomes.	Fluidextract, U. S. P.							Ether extract.						
	Volatile oil.				Non-volatile.		Ether-soluble extractive.	Volatile oil.				Non-volatile.		Ether-soluble Extractive.
	%	Sp. gr.	Op. rot. deg.	Ref. I.	%	I no.	Sapn. no.	%	Sp. gr.	Op. rot. deg.	Ref. I.	%	I no.	Sapn. no.
Cochin	1.7	0.877	−50	1.492	4.2	32.2	37.4	1.7	0.877	−50	1.492	4.2	36.5	37.2
African	2.55	0.885	−52	1.492	6.2	28.2	45.2	2.6	0.885	−52	1.492	6.3	28.1	44.8
African	2.55	0.877	−51.5	1.492	5.9	29.4	51.0	2.5	0.877	−52	1.492	5.7	29.6	52.0
Jamaican	1.5	0.877	−46	1.490	4.0	23.2	52.0	1.55	0.877	−46	1.490	4.1	23.1	54.1
African	2.3	0.876	−52	1.491	4.9	31.1	32.0	2.2	0.876	−52	1.4915	5.1	30.8	31.0

The results in Table I show that the analyses of the fluidextracts prepared from the rhizomes of several varieties of ginger are essentially the same as the analyses of the ether extracts prepared from equivalent quantities of the same rhizomes of ginger. The continuous ether extraction method was adopted for the analysis of ginger rhizomes because it is shorter and offers less opportunity for error.

ANALYSES OF SAMPLES.

Samples of Jamaican, African, Indian and Cochin ginger purchased on the open market and many samples of ginger rhizomes imported during the season of 1926–1927, as well as fluidextracts of ginger purchased on the open market and samples collected by inspectors of the Bureau of Prohibition of the Treasury Department, were analyzed. Representative results of these analyses are given in Table II.

TABLE II.—ANALYSIS OF RHIZOMES OF GINGER.

Source.	Volatile oil.			Non-volatile ether-soluble extractive.		
	%	Ref. index.	Op. rot.	%	I no.	Sapn. no.
Jamaica	1.2	1.493	−48°	3.5	36.6	63.8
Jamaica	1.8	1.491	−42°	3.9	44.5	60.9
Africa	2.6	1.493	−53°	6.2	34.8	61.7
Africa	3.1	1.492	−55°	7.1	38.7	50.0
Africa	2.4	1.490	−58°	5.7	36.7	58.0
Africa*	1.6	1.491	−27°	5.6	50.2	57.0
India	3.1	1.492	−50°	6.3	42.2	61.2
India	1.8	1.493	−55°	3.5	38.2	50.0
India	2.8	1.493	−51°	6.0	44.7	60.0
Cochin	2.0	1.490	...	5.0	44.7	75.0
Cochin	1.0	1.492	−45°	4.1	50.0	66.0

* Rhizome old and wormy.

TABLE III.—ANALYSIS OF FLUIDEXTRACT OF GINGER.

Source.	Volatile oil.			Non-volatile ether-soluble extractive.		
	%	Ref. index.	Op. rot.	%	I no.	Sapn. no.
Laboratory	2.8	1.490	−56°	7.0	29.2	45.8
Laboratory	1.9	1.492	−45°	4.48	44.5	75.0
Laboratory*	1.9	1.492	−45°	6.3	60.9	120.0
Trade	1.2	1.492	−55°	2.9	42.3	60.0
Trade	1.2	1.492	−35°	3.2	43.6	80.5
Trade	0.25	1.491	−27°	3.5	65.0	99.0
Trade	0.3	1.495	...	3.2	67.0	118.0
Trade	Trace	...	...	2.8	79.1	157.3

* Approximately 20% of castor oil was added.

The results in Table II show that: (*a*) The yield of volatile oil (1.2% to 3.1%) varies with the variety of ginger, African giving the highest yield; (*b*) the physical

constants of the volatile oils of all the varieties are essentially identical; (*c*) the non-volatile ether-soluble extractive varies from 3.5% to 7.1%, and gives an iodine value between 36 and 50 and a saponification value between 50 and 75, the African giving the highest yield.

Representative results of analysis of samples of fluidextracts of ginger are given in Table III.

The results in Table III show that the yield of volatile oil, together with the yield and the constants obtained on the non-volatile ether-soluble extractive of a fluidextract of ginger, can be used as an indicator in determining the character of ginger and ginger preparations.

DETECTION OF PRESENCE OF ADULTERANTS.

Because of a suspicion that some of the fluidextracts of ginger on the market are adulterated with fixed oils, experiments were carried on to determine the influence of certain types of adulterants when added to a given fluidextract. Results of the analyses made are given in Table IV.

TABLE IV.—ANALYSIS OF FLUIDEXTRACT OF AFRICAN GINGER WITH SEVERAL ADULTERANTS.

Adulterant added to 50 cc. of fluidextract.	Volatile oil.				Non-volatile ether-soluble extractive.		
	%	Spec. grav.	Op. rot.	Ref. index.	%	I no.	Sapn. no.
None	2.5	0.876	−55°	1.492	7.5	36.3	41.1
1.95 Gm. cotton-seed oil	2.5	0.876	−53°	1.492	11.32	47.1	85.4
1.5 Gm. castor oil	2.5	0.876	−53°	1.492	10.32	47.9	89.9
1.975 Gm. liquid petrolatum	2.5	0.876	−53°	1.491	11.6	26.0	32.7

The results in Table IV show that: (*a*) The presence of the adulterants does not materially influence the yield or physical constants of the volatile oil; (*b*) the added adulterants, being soluble in ether, appear approximately quantitatively in the yield of non-volatile ether-soluble extractives; (*c*) cottonseed and castor oils, giving high iodine and saponification values, are evidenced by the higher iodine and saponification values obtained for the non-volatile ether-soluble extractives containing these added oils; (*d*) liquid petrolatum, giving practically no iodine or saponification values, is evidenced by the distinctly lower iodine and saponification values obtained for the non-volatile ether-soluble extractive containing this added oil.

CONCLUSION.

The results reported in this paper indicate that fluidextracts and rhizomes of ginger should meet the following requirements:

Volatile oil:	
Proportion (per cent)	1.2 to 3.0
Specific gravity, 25° C.	0.876 to 0.885
Optical rotation, 25° C.	−40° to −56°
Index of refraction, 20° C.	1.490 to 1.493
Non-volatile ether-soluble extractive:	
Proportion (per cent)	3.5 to 7.1
Iodine value	36 to 50
Saponification value	45 to 70

Although the physical constants of the extractives from the different varieties of ginger vary considerably, the addition of appreciable quantities of an adulterant to a fluidextract of ginger may be readily detected by the method here described.

THE ACTIONS AND BIOLOGIC ASSAY OF EPHEDRINE.[1]

BY PAUL S. PITTENGER.

Ephedrine is an active alkaloid originally isolated in an impure form from the Asiatic drug, Ma Huang, by Yamanashi. It was first isolated in the pure form by Nagai.[2]

Ma Huang, identified as *Epheera vulgaris* **var.** *helvetica*, has been used in the practice of medicine in China for more than five thousand years but remained practically unknown until revived by the vast researches and publications of pharmacological and clinical studies by Chen and Schmidt and Chen[3] during 1924 to 1926.

The empirical formula for ephedrine is $C_{10}H_{15}ON$; its chemical structure most probably is 1-phenyl-2-methylaminopropanol-1 $C_6H_3.CHOH.CH(NH-CH_3)CH_3$.

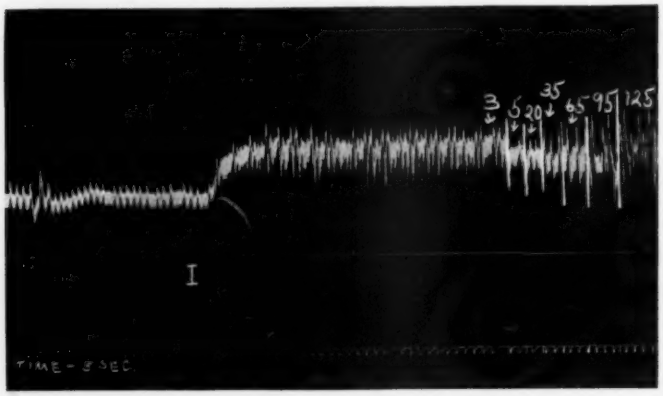


Fig. 1.—Effect of intravenous administration of ephedrine upon the circulation. 0.2 cc. of a 3 per cent solution of ephedrine sulphate intravenously injected at I. Figures above tracing indicate the number of minutes after injection.

It will be noted by the chemical composition of ephedrine that it is allied closely to epinephrine. In many ways it also simulates epinephrine in its physiologic action. Its effects on the circulation, smooth muscle and secretions are due to sympathetic stimulation and resemble qualitatively those of epinephrine. In addition it stimulates the central nervous system and depresses the heart, but these effects are elicited ordinarily only by toxic doses.

It produces a rise in blood pressure due to vasoconstriction and cardiac stimulation. It stimulates uterine muscle and relaxes the bronchial muscle. It also possesses mydriatic action.

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[1] Read before the Scientific Section of the American Drug Manufacturers' Association, New York City, March 30, 1928.

[2] Nagai, *Pharm. Ztg.*, 32 (1887), 700.

[3] Chen and Schmidt, *Proc. Soc. Exptl. Biol. Med.*, 21 (1924), 351; *J. Pharmacol.*, 24 (1924), 339; *China Med. J.*, 39 (1925), 382; Chen, *Proc. Soc. Exptl. Biol. Med.*, 22 (1924), 203; 22 (1925), 404; 22 (1925), 568; 22 (1925), 570; Jour. A. Ph. A., 14 (1925), 189; *J. Pharmacol.*, 26 (1925), 83; 27 (1926), 61; 28 (1926), 77; 27 (1926), 87; 27 (1926), 239.

Quantitatively, however, there are important differences in the effects of epinephrine and ephedrine. Ephedrine is much less powerful than epinephrine but its effects are much more persistent. (See Figs. 1 and 2.) These figures show that an intravenous injection of 0.2 cc. of a 1–10,000 solution of epinephrine produced a greater rise in blood pressure than the same size dose of a 3 per cent solution of ephedrine. On the other hand the blood pressure returned to normal within five minutes after the injection of the epinephrine whereas the pressure was considerably above normal one hundred and twenty-five minutes after the injection of the ephedrine.

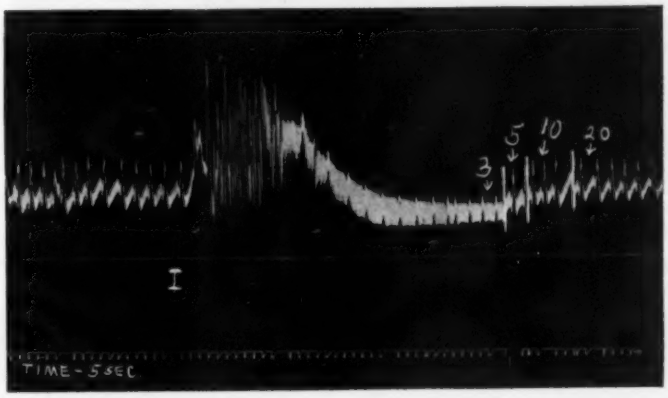

Fig. 2.—Effect of intravenous administration of epinephrine upon the circulation. 0.2 cc. of a 1–10,000 solution of epinephrine hydrochloride injected intravenously at I. Figures above tracing indicate the number of minutes after injection.

Ephedrine also differs from epinephrine in that *it is active when administered orally.* Epinephrine given by stomach does not produce appreciable systemic reactions in normal animals even when administered in large doses. According to Rowe[1]

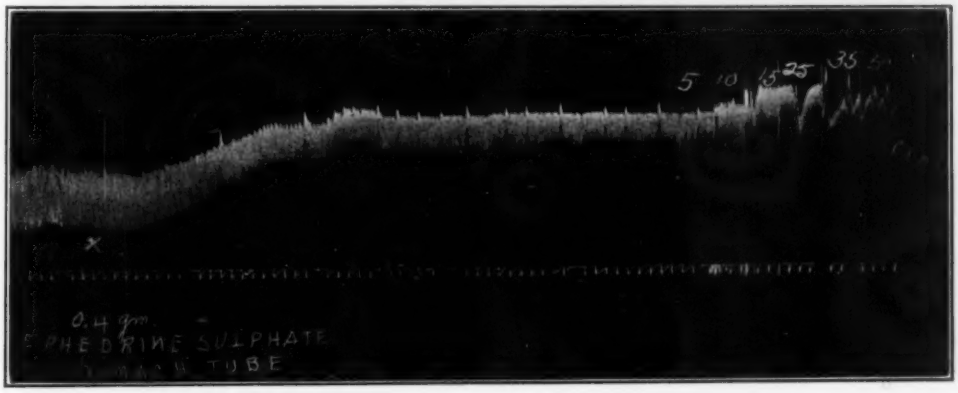

Fig. 3.—Effect of oral administration of ephedrine upon the circulation. 0.4 Gm. ephedrine sulphate administered by stomach tube at X. Figures above tracing indicate the number of minutes after administration.

"This is due partially to the rapid destruction of the adrenalin in the stomach before it can be absorbed and to the prevention of absorption by the powerful vasoconstrictor action on the vessels of the alimentary tract."

[1] Rowe: "The Comparative Pharmacologic Action of Ephedrine and Adrenalin," Jour. A. Ph. A., 10 (1927), 912.

The effect of oral administration of ephedrine upon the blood pressure is shown in Figs. 3, 4 and 5. These tracings show the rises in blood-pressure produced by doses of 0.4, 0.75 and 1.0 Gm., respectively, of ephedrine sulphate administered by stomach tube to anæsthetized dogs, which had been previously starved for 24 hours.

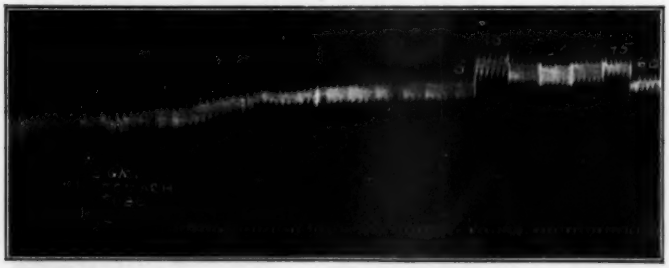

Fig. 4.—Effect of oral administration of ephedrine upon the circulation. 0.75 Gm. ephedrine sulphate administered orally at X. Figures above tracing indicate the number of minutes after administration.

The dose of 0.4 Gm. administered orally produced a rise in pressure of 34 mm. within 5 minutes. The maximum rise of 52 mm. occurred 35 minutes after administration. (See Fig. 3.)

The dose of 0.75 Gm. administered orally produced a rise in pressure of 36 mm. within 5 minutes. The maximum rise of 64 mm. occurred 10 minutes after administration. (See Fig. 4.)

The dose of 1.0 Gm. administered orally produced a rise in pressure of 40 mm. within 5 minutes. The maximum rise of 96 mm. occurred 40 minutes after administration. (See Fig. 5.)

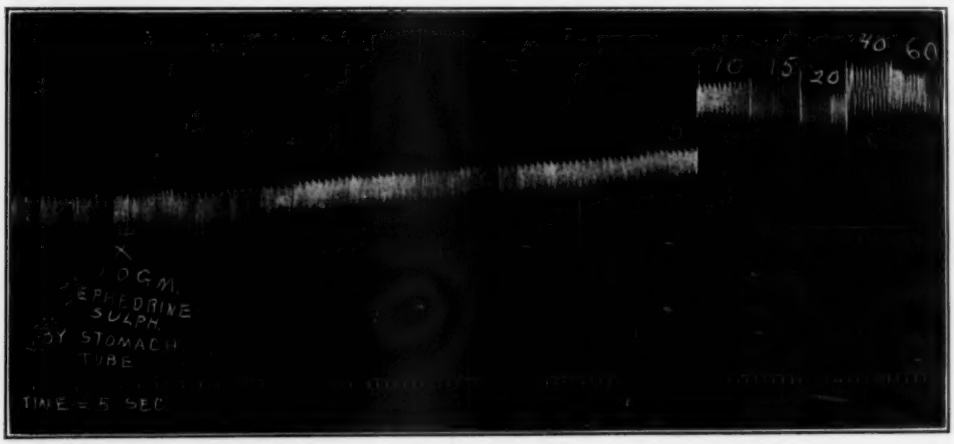

Fig. 5.—Effect of oral administration of ephedrine upon the circulation. 1.0 Gm. ephedrine sulphate administered by stomach tube at X. Figures above tracing indicate the number of minutes after administration.

The above results are typical of those obtained in a series of twenty experiments on the oral administration of ephedrine.

It will be noted, therefore, that the rises in pressure obtained by the author are from 4.5 to 12.7 times as great as Rowe reports having obtained from doses of the same size;[1] also that the author obtained in all cases a rise in pressure of

from 34 mm. to 40 mm. within 5 minutes after administration of the drug whereas Rowe obtained a maximum rise of only 7 to 14 mm. within $1^1/_2$ to 2 hours.

A comparison between the results obtained by the author and those obtained by Rowe from doses of equal size is shown below:

Dose.	Results.
0.4 Gm.	Rowe—Maximum rise of 7 mm. in $1^1/_2$ hours
	Pittenger—Maximum rise of 52 mm. in 35 minutes
0.8 Gm.	Rowe—Maximum rise of 14 mm. in 2 hours
0.75 Gm.	Pittenger—Maximum rise of 64 mm. in 10 minutes
1.0 Gm.	Rowe—Maximum rise of 8 mm. in $1^1/_2$ hours
	Pittenger—Maximum rise of 102 mm. in 17 minutes

Rowe, however, in all cases administered a dose of 10 mg. intravenously from one to two hours previous to the administration of the oral dose. This, he states, is for the purpose of showing the susceptibility of the dog to the drug.

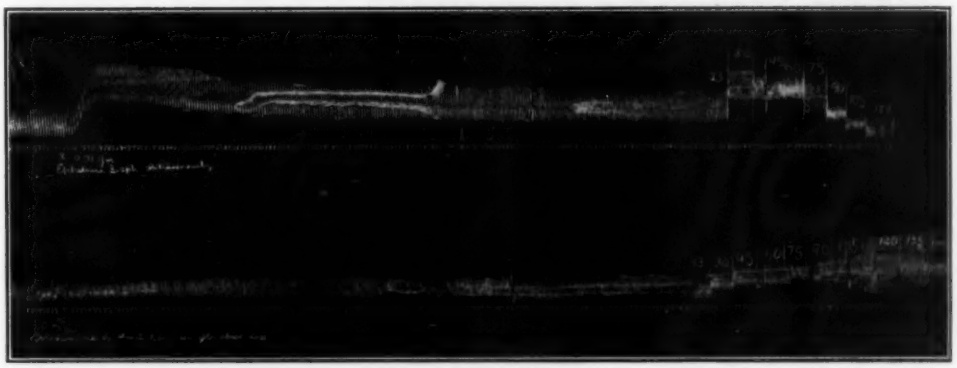

Fig. 6.—Upper row: 0.01 Gm. ephedrine sulphate administered intravenously. Lower row: 0.75 Gm. ephedrine sulphate administered orally to the same dog, two hours after the intravenous injection.

It has been the author's experience and the literature contains references to the fact that in many cases a tolerance is exhibited after the first intravenous injection of ephedrine.

In order to determine if the small preliminary intravenous injection administered by Rowe was sufficient to establish a tolerance or whether the differences in our results were due to variations in the potency of the ephedrine we carried out an experiment according to Rowe's technique using the same ephedrine with which we obtained the above results.

The results of this experiment are shown in Fig. 6. It will be noted that the preliminary intravenous injection of 10 mg. of ephedrine produced a rise in blood pressure of 70 mm. within one minute and kept the pressure above normal for $1^1/_2$ hours. After two hours a dose of 0.75 Gm. administered by stomach tube produced a rise of only 4 mm. within 5 minutes and a maximum rise of only 34 mm. within 2 hours.

It is apparent, therefore, that the preliminary intravenous injection, as employed by Rowe, instead of proving the sensitiveness of the animal actually de-

stroys its sensitiveness to succeeding doses whether administered intravenously or orally.

These results would tend to prove, therefore, that the actual rise in blood-pressure produced by the oral administration of certain doses of ephedrine is from $4^1/_2$ to 12 times as great as previously reported.

Ephedrine further differs from epinephrine in that its solutions are stable indefinitely even when exposed to light and air and are not decomposed on boiling. Solutions of epinephrine decompose rapidly upon exposure to light, air and on boiling. For this reason commercial solutions are protected by amber bottles and are sealed in an atmosphere of carbon dioxide.

Ephedrine combines readily with acids to form the sulphate, chloride, nitrate, acetate, etc. There is no important therapeutic differences between the various salts but in view of the fact that most alkaloids may be purified to a higher degree in the form of their sulphates, most of the manufacturers are marketing ephedrine sulphate in preference to the hydrochloride or other salts.

Ephedrine, therefore, although somewhat similar to epinephrine chemically and in its qualitative actions is quite different in its quantitative action.

Present indications are that its therapeutic usefulness will be more limited and in many cases quite distinctive from those of epinephrine.

BIOLOGIC ASSAY OF EPHEDRA OR EPHEDRINE.

The purity of the various salts of ephedrine may be established by chemical methods. It is, however, advisable to verify these results by biologic tests, due to the fact that when the compound is synthesized the racemic variety is obtained which is not so active as the levo-variety which occurs in the natural product.

A marked variation in the activity is also found in the crude drug. There are many varieties of ephedra[1] some of which are practically inactive. The analysis of a number of samples of Ephedra vulgaris were found to have an alkaloidal content ranging from 0.2 per cent to 0.9 per cent of total alkaloid. (Nielson *et al.*) Later investigations by Feng and Read[2] show that when fully extracted the total yield of alkaloids may exceed 1 per cent.

Of the various physiologic actions of ephedrine there are two which present themselves as possible means of biologic standardization, *i. e.*, the mydriatic action and the action on the blood pressure. The action chosen for testing the drug should be governed largely by the therapeutic effects it is desired to produce.

For example, if it is to be used as suggested by Middleton and Chen[3] in connection with other drugs for the purpose of producing mydriasis, it should perhaps be standardized according to its mydriatic action. At least this procedure should be followed until it has been proven that the mydriatic action and the action upon the blood vessels parallel each other. If it is to be used for its effects on circulation, smooth muscle and secretions due to its sympathetic stimulation it should be tested for its effect upon the blood pressure.

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[1] "The Occurrence and Alkaloidal Content of Various Ephedra Species," by Neilson, McCousland and Spruth, JOUR. A. PH. A., 16 (1927), 288.

[2] "The Ephedrine Assay of Chinese Ephedra," by C. T. Feng and B. E. Read, JOUR. A. PH. A., 16 (1927), 1030.

[3] Middleton and Chen, *Arch. Intern. Med.*, 39 (1927), 385.

It is difficult to devise a quantitative blood-pressure method owing to the peculiarity of the drug in that the size of the dose does not accurately govern the resultant rise in blood pressure, also to the fact that, as previously shown, in many cases a tolerance is exhibited after the first injection of the drug. Feng and Read[2] claim that this variation in response and the tolerance exhibited after the first injection of comparatively large doses may be practically eliminated if the drug is administered in small doses. They state that small doses will produce an appreciable rise in blood-pressure and if repeated at sufficiently long intervals will show like effect accurate enough for assay purposes. They recommend the injection of doses of 0.001 Gm. at intervals of one hour.

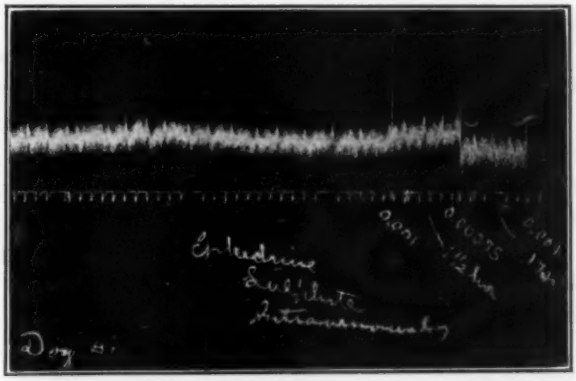

Fig. 7.—Tracing showing tolerance produced by an initial dose of 0.001 Gm. of ephedrine sulphate. Note that the second injection of 0.001 Gm. produced less rise in pressure than the dose of 0.00075 Gm.

We have performed experiments upon ten different dogs in an attempt to check the results obtained by Feng and Read. In every instance, however, the initial injection of 0.001 Gm. produced a tolerance with the result that the rises in pressure produced by succeeding doses were not in proportion to the amounts injected.

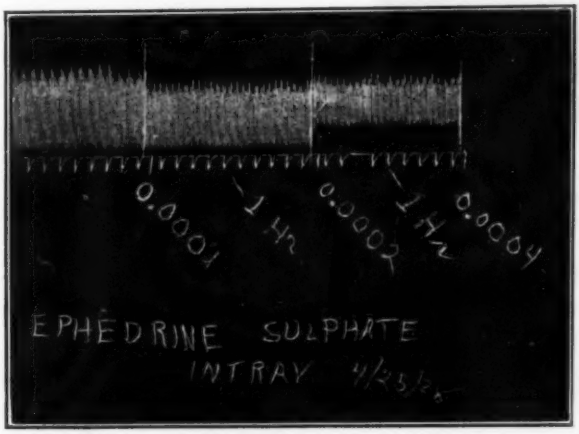

Fig. 8.—Tracing showing tolerance produced by an initial injection of 0.0001 Gm. of ephedrine sulphate. Injections of 0.0001, 0.0002 and 0.0004 Gm., respectively, were administered at one-hour intervals.

Figure 7 is typical of the results obtained. It will be noted that the initial injection of 0.001 Gm. produced a marked rise in pressure. This was followed after one and one-half hours by an injection of 0.00075 Gm. which produced a rise of only 25% of that produced by the initial injection of 0.001 Gm. This was followed after an interval of one hour by a second injection of 0.001 Gm. which produced a rise of less than 25% of that produced by the initial injection.

It has been our experience, therefore, that in every experiment a dose of 0.001 Gm. produces a marked tolerance.

In an endeavor to eliminate, if possible, the tolerance following the first

injection additional experiments were conducted in which the amount of ephedrine sulphate injected was progressively decreased until we determined the approximate minimum-effective-dose. It was found that practically all dogs will respond to intravenous doses of from 0.0001 to 0.0005 or from $^1/_{10}$ to $^1/_2$ the amount employed by Feng and Read.

Experiments were then made to determine whether dogs would respond quantitatively to doses ranging from 0.0001 to 0.0005 Gm.

The results of these experiments were the same as those obtained with the larger amounts. The initial doses of only 0.0001 Gm. in every case but one established a tolerance so that succeeding doses would not produce rises in proportion to the amounts injected.

Figure 8 is typical of the results obtained with these smaller doses. The first injection of 0.0001 Gm. produced a rise in blood pressure of 11 mm. After one hour an injection of 0.0002 Gm. produced a rise of 13 mm. One hour later an injection of 0.0004 Gm. produced a rise of only 6 mm.

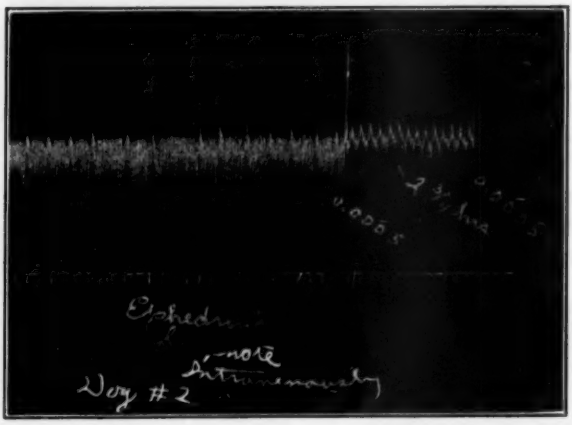

Fig. 9.—Tracing showing tolerance produced by an initial injection of 0.0005 Gm. Note that second injection of the same amount only produced one-half the rise of the first.

Figure 9 shows the results obtained from two injections of 0.0005 Gm. Although an interval of $2^3/_4$ hours was allowed between the injections, the second injection produced a rise only one-half as great as the first.

The only apparent difference in the technique employed by Feng and Read and ourselves is that they state that their animals were luminalized whereas our dogs were anæsthetized with morphine and chlorbutanol.

It is apparent, therefore, that we do not at the present time have a reliable quantitative biologic assay method for ephedrine or uniform methods of measuring the results obtained from the various forms of administration.

In view of the steadily increasing demand and use for this drug I would propose that the Scientific Section of the American Drug Manufacturers' Association appoint a "Committee on Ephedrine" for the purpose of standardizing the technique for measuring its various actions and if possible develop a satisfactory biologic assay method.

RESEARCH PHARMACOLOGIC LABORATORY,
SHARP & DOHME,
BALTIMORE, MD.
April 24, 1928.

THE STANDARDIZATION OF DIGITALIS PREPARATIONS.

BY E. E. SWANSON AND C. C. HARGRAVES.

1. REVIEW OF LITERATURE; 2. DATA; 3. DISCUSSION AND CONCLUSIONS.

The question of a suitable standardization method for the biological or chemical assay of digitalis has been a subject of considerable controversy and discussion for many years. Perhaps on no other drug has there been more variety or kinds of methods suggested for its standardization. The physiological assay of digitalis is determined on both cold-blooded and warm-blooded animals. Such methods have been introduced and discussed by Houghton (1), Hatcher and Brody (2), Houghton and Hamilton (3), Edmunds and Hale (4), Ziegenbein (5), Eckler (6), Holste (7), Reed and Vanderkleed (8), Famulener and Lyons (9), Locke (10), Heinz (11), Pittenger and Vanderkleed (12), Führer (13), Kobert (14), Pick and Wasicky (15), Heffter (16), Gottlieb (17), Storm Van Leeuwen (18), Wiechowski (19), Watanabe (20), and a host of others. The most important methods at present in use are the one-hour frog method U. S. P. or modification of this method, and Hatcher's and Brody's (2) cat method together with modifications and suggestions. Reed and Vanderkleed (8) suggested the use of guinea-pigs, a method which is still preferred by many workers; Berry (21) carefully worked out a heart perfusion test; Hale (22) has shown the adequacy of the one-hour frog method (U. S. P.); Roth (23) also finds the one-hour frog method (U. S. P.) favorable. Hatcher's cat method has been studied and modifications found and suggested by Macht and Colson (24), Rowntree and Macht (25), Eggleston (26), den Besten and de Lind van Wijngaarden (27), Haskell and Courtney (28), Kuroda (29), de Lind van Wijngaarden (30), and more recently that of Knaffl-Lenz (31) and McFarlane and Masson (32). The recent work of Straub (33) and his co-workers and Erik Knaffl-Lenz (31) on the standardization of digitalis on cats and guinea-pigs in connection with the Hygiene Committee of the League of Nations is very important. Hirschfelder (34) studied the effect of temperature on the action and toxicity of digitalis testing; Dooley and Higley (35) found an intramuscular injection in frogs to be accurate; Schneider (36) suggested the use of paramecia as a test method; Berardi (37) and Berardi, Canan and McGuigan (38) describe a method of assay on normal and anæsthetized dogs. Hanzlik and Shoemaker (39) suggested the use of pigeons as an index for the therapeutic potency. Bond (40) found that the M. L. D. to the heart weight will give a biological comparison. Knudson and Dresbach (41) reported a colorimetric method of testing digitalis, but Wible (42) and Rowe (43) found this to be unreliable. More recently Macht and Krantz (44) reported an interesting method of study and testing of digitalis called phytopharmacology or a plant method of standardization of digitalis preparations on the growth on the seedlings of Lupinus Albus.

2. DATA.

Considering the above brief review of the literature all of which have very valuable and interesting data, a more reliable biological and chemical method still remains to be studied. However, perhaps with a more careful study of some of the above methods by various workers and a standardization of technic, a method

might be found that will be satisfactory for an accurate indication of the therapeutic action of digitalis.

The purpose of this paper is not to suggest a new method of assay, but to study some of the more important or well-known methods of standardization of digitalis now in use and to compare them with the colorimetric method of Knudson and Dresbach. The writers had planned a series of experiments covering all samples of digitalis for a period of two years, but before the completion of this work, Wible and Rowe reported their results which so confirmed our findings, that a further study of this series did not seem practical.

The biological methods studied are, first, the one-hour frog method (U. S. P.), second, Houghton's twelve-hour frog method, third, guinea-pig method, and, fourth, Hatcher's cat method. The chemical method of Knudson and Dresbach is compared with the one-hour frog method (U. S. P.). Table I includes the comparative assay of four Digiglusin samples, four Fluidextract of Digitalis N. F. samples and four Tincture Digitalis U. S. P. samples by the above five methods, together with nine samples of Tincture Digitalis U. S. P. assayed by the one-hour frog method and the colorimetric method.

TABLE I.

Kind of preparation. Digiglusin no.	Frog (U. S. P.) per cent activity.	Frog (Houghton) per cent activity.	Guinea-pig (Vanderkleed) per cent activity.	Cat (Hatcher) per cent activity.	Colorimetric (Knudson) per cent activity.	Color error between U. S. P. frog and colorimetric. Low %.
1	100	90	95	92	85	17
2	106	95	109	90	70	51
3	136	126	125	120	100	36
4	302	280	300	285	230	31
F. E. digit. no.						High %.
1	85	92	90	80	120	35
2	100	95	110	90	182	44
3	100	110	115	95	153	34
4	90	85	92	80	140	35
Tr. digit. U. S. P. no.						High %.
1	100	91	85	92	175	50
2	100	97	90	90	282	64
3	75	70	60	50	137	45
4	100	95	90	82	158	36
5	100	..	..	..	152	34
6	70	..	..	..	80	12
7	160	..	..	..	182	12
8	120	..	..	..	250	53
9	73	..	..	..	178	60
10	120	..	..	..	250	53
11	100	..	..	..	140	28
12	100	..	..	..	158	36
13	72	..	..	..	154	36

Sample No. 10 is the same as Sample No. 8, but tested a month later.

Table II includes a comparison of the one-hour frog method and the colorimetric method with ouabain as a color standard.

TABLE II.

Digiglusin sample.	(U. S. P. frog) per cent activity, ouabain standard.	(Colorimetric) per cent activity, ouabain standard.	Color error.
No. 5	127%	67%	89% low
No. 6	86%	82%	4.8% low
No. 7	33%	30%	10% low
No. 8	123%	55%	120% low
No. 9	55.2%	48%	50% low
No. 10	44.2%	....	....

Table III includes a comparison of the one-hour frog method and colorimetric method with a standard digiglusin as a standard color reaction.

TABLE III.

Digiglusin, sample.	U. S. P. frog per cent activity, digiglusin standard.	Colorimetric per cent activity digiglusin, standard.	Color error.
No. 5	127%	117%	9% low
No. 6	78%	71%	10% low
No. 7	33.4%	46%	19% high
No. 8	111%	133%	16% high
No. 9	55%	80%	31% high
No. 10	44%	70%	37% high

In Table I the assay of the digiglusin, tincture and fluidextract samples by the four biological methods seems to correlate rather consistently. The colorimetric method assays low for digiglusin samples, and high for tinctures and fluidextracts.

In Tables II and III six samples of digiglusin were compared with ouabain as a color standard and a standard digiglusin as a color standard. The colorimetric method with ouabain as a color standard gave low results as compared with the biological method. The colorimetric method with digiglusin as a color standard gave two low figures and four high figures. These variable figures leaves a rather questionable answer in regard to the accuracy of the colorimetric method.

DISCUSSION AND CONCLUSIONS.

Considering the review of the above literature and data on the biological and chemical methods, the comparative relationship is still more complex, which leads one to conclude that it is not possible to determine the absolute content of the various glucosides. However, as Erik Knaffl-Lenz states, if the conditions of technic are carefully controlled, it is possible by some of the biological methods on either warm-blooded or cold-blooded animals to obtain relative values of some consistency. The value of the biological methods is dependent on the clinical or therapeutic index, and inasmuch as digitalis is given by clinicians in repeated doses until the therapeutic effect is obtained—the amount given to obtain this therapeutic effect being irregular for individual patients—a more accurate method of assay than the ones now in use is not absolutely essential. An accurate biological or chemical method could more easily be developed if the various glucosides were isolated, purified and their chemical, physiological and therapeutic properties studied, for we know of no accurate relationship between the M. L. D. as determined by an animal experiment and the amount of the drug required to produce a therapeutic effect. If a biological method could be worked out that would indicate a minimum effective dose, or

therapeutic dose and the minimum lethal dose or a definite safety margin, a greater relationship would exist between biological methods and therapeutic effect. Therefore, as long as biochemists are not in a position to determine accurately the chemical, physiological and therapeutic properties of the pure isolated glucosides, the biological methods now in use do not justify a greater increase in accuracy.

The writers are much indebted to Miss Lucile Carter, librarian for reference work and criticisms.

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ABSTRACT OF DISCUSSION.

J. C. Munch was particularly interested in the close agreement of the various physiological methods of assay; he recognized the amount of work involved in the report presented by the author, and referred briefly to the many methods of assay; the efforts of the laboratory were directed to find out which method of the animal assays corresponded most closely to results obtained upon humans. In his opinion, the fact that clinicians and general practitioners give repeated doses is no reason why market preparations should be permitted to vary in potency. His conclusions, based on samples of the same lot of tincture of digitalis given into the hands of 28 collaborators, were that there should be not more than 15% variance in assay results. Digitalis should, for obvious reasons, be represented in preparations uniform in strength; otherwise there will be a demand for a standardization method which will bring this about. He hoped it would be possible to standardize digitalis preparations within reasonable limits of the U. S. P.

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NOTES ON DIGITALIN STANDARDIZATION.*

L. W. ROWE.

For many years prior to the world war there was available on the American market, a water soluble, highly active digitalis preparation known as *Digitalin*, German, which was reasonably uniform in potency. During the war this product became almost unobtainable and the quality of supplies available since the war has varied widely in potency, most of it being very inferior.

Though different lots of digitalin are not uniform in chemical composition as well as physiological potency and though it has never been made official in the U. S. P. there has been a large amount of it prescribed, both orally and hypodermically, because it does not deteriorate and is fairly well absorbed in the small dosage necessary.

Since no official standard was ever set for this important digitalis preparation and no method of assay recommended, it is obvious that each manufacturer must set his own standard and these evidently varied considerably. For many years we assayed digitalin by the Houghton M. L. D. Frog Method with reasonable success. True the irritant action of the solution injected into the frog often caused the lymph sac to become filled with fluid which delayed absorption, but the period of time allowed (12 to 18 hours) was long enough for most of the activity to be absorbed from the diluted contents of the lymph sac. With the officially recommended One-Hour Frog Method the case is entirely different since the time is so short that complete absorption cannot take place and indefinite results are to be expected.

As an example of the results obtained in testing digitalin by the One-Hour Frog Method take the following data on lot No. 309,390.

The M. S. D. in this case was reported to be 0.00020 Gm. per Gm. to 0.00030 Gm. but there was nothing definite or satisfactory about it. With U. S. P. Ouabain giving an M. S. D. at this time of 0.0000008 Gm. per Gm. it is found that 1 Gm. of this digitalin is about equivalent to 3.3 mg. of ouabain.

In the tests of four other samples of digitalin by the "One-Hour Method" results were just as indefinite and unsatisfactory.

* Scientific Section, A. PH. A., St. Louis meeting, 1927.

Frog.	Wt., Gm.	Dose.	Dil.	Total.	Result.	Remarks.
1	13	.00012 Gm.	1–100	.16 cc.	Beating	
2	13	15 Gm.		.20 cc.	Beating	
3	13	20 Gm.		.26 cc.	Stopped?	Indefinite
4	20.5	15 Gm.		.31 cc.	Beating	
5	20.5	18 Gm.		.37 cc.	Beating	
6	21	22 Gm.		.46 cc.	Beating	
7	22.5	15 Gm.	1–50	.17 cc.	Beating	
8	21.5	20 Gm.		.22 cc.	Stopped	Diastole not systole
9	23.5	25 Gm.		.29 cc.	Stopped	Diastole not systole
10	17	15 Gm.		.13 cc.	Beating	
11	20.5	20 Gm.		.21 cc.	Beating	
12	20	25 Gm.		.25 cc.	Beating?	Indefinite
13	17.5	15 Gm.		.13 cc.	Beating	Almost stopped
14	21	20 Gm.		.21 cc.	Beating	Almost stopped
15	22.5	25 Gm.		.28 cc.	Beating	Almost stopped

Absorption was always incomplete in the time limit of one hour although the dose injected was very small and of a fairly dilute solution.

No. 1.			No. 2.	
Dose.	Result.		Dose.	Result.
.00002 Gm.	Beating		.00007 Gm.	Beating
3 Gm.	Beating?		8 Gm.	Beating
5 Gm.	Beating?		10 Gm.	Beating
6 Gm.	Stopped		10 Gm.	Beating
10 Gm.	Stopped		12 Gm.	Beating
15 Gm.	Stopped		15 Gm.	Beating
.00004 Gm.	Beating?		12 Gm.	Beating
5 Gm.	Beating?		15 Gm.	Stopped
6 Gm.	Beating?		20 Gm.	Stopped
5 Gm.	Beating		12 Gm.	Beating?
6 Gm.	Stopped.	Not systole	15 Gm.	Beating?
8 Gm.	Stopped.	Not systole	20 Gm.	Beating?

No. 3.		No. 4.	
Dose.	Result.	Dose.	Result.
.00015 Gm.	Stopped	.00010 Gm.	Stopped
20 Gm.	Stopped	15 Gm.	Beating
25 Gm.	Stopped	20 Gm.	Stopped
12 Gm.	Beating	10 Gm.	Beating
15 Gm.	Beating?	15 Gm.	Stopped
18 Gm.	Stopped	20 Gm.	Beating
12 Gm.	Stopped	10 Gm.	Stopped
15 Gm.	Stopped?	15 Gm.	Stopped
18 Gm.	Beating	20 Gm.	Stopped
12 Gm.	Beating	10 Gm.	Beating
15 Gm.	Beating	15 Gm.	Beating
18 Gm.	Stopped	20 Gm.	Beating
		10 Gm.	Beating
		15 Gm.	Stopped?
		20 Gm.	Stopped

Because of these very indefinite results with the "One-Hour Method" on Digitalin and because the M. L. D. "Frog Method" is not entirely satisfactory, due to the frogs sometimes being nearer dead than alive and yet not actually dead, other methods were tried such as the Cat Method, the Guinea-Pig Method and finally the "mouse" intraperitoneally. One sample (No. 309,390) required six

cats and of the four successful experiments the average M. L. D. was 6.23 mg. per Kg. The variation between the lowest and highest M. L. D. in this series of 4 was 74% which is quite extreme. Two experiments were unsuccessful because the animals did not die within a reasonable time from comparatively large doses.

Guinea-pigs injected subcutaneously give satisfactory results but an average of 10 or 12 pigs is necessary for an assay and this makes the cost very high. Three such tests were made and will be included in the table summarizing the tests by the various methods.

The white mouse injected intraperitoneally seemed logical as a test animal for digitalin since it absorbs the drug readily and can be used in large numbers because of its relative cost. Most important, however, was its satisfactory use in standardizing aconite as previously reported. Several tests were made by this method and the results will appear in the following general table of data where tests by all the methods are grouped.

Sample.	M. L. D. Frog Method.	U. S. P. Frog Method.	Guinea-Pig.	White Mouse.
No. 295460	.000060 Gm. per Gm. 1100 H. T. U.	About .00006 Gm.	.000015 Gm. per Gm.	.....
No. 49929	.00012 Gm. per Gm. 300 H. T. U.	.00010 to .00020 Gm.	.000025 Gm. per Gm.	.....
No. 309390	.00030 Gm. per Gm. 120 H. T. U.	.00020 to 30 Gm. 8 for ouabain		
DCC	.00014 Gm. per Gm. 400 H. T. U.	.00015 to 25 Gm.	.000040 Gm.	.00018 Gm.
No. 313823	.00005 Gm. per Gm. 1200 H. T. U.	.00010 to 20 Gm.		.00012 Gm.

This table shows, first of all, the impossibility of using the official U. S. P. digitalis method for assaying digitalin. The M. L. D. Frog Method can be used but it often shows some indefinite results. The Cat Method was very unpromising in the assay of one sample. The Guinea-Pig Method could be used but is quite expensive. The white mouse injected intraperitoneally seemed very promising in the limited experiments because results can be read in 5 or 6 hours and the animals are reasonable in price, so that a number could be used for one test. Further comparative data would be necessary, however, before a definite standard could be set.

ABSTRACT OF DISCUSSION.

The author stated that his paper was presented as a preliminary report, that standardization of digitalin is in its infancy. He hoped that the report would stimulate further interest so that a suitable method for assay and a reliable standard would result.

J. C. Munch said he had found assay of digitalin rather unsatisfactory; in his opinion the white mouse, as a test animal, might prove best.

Paul S. Pittenger stated that the guinea-pig had proven satisfactory; relative to the expense, the surviving animals could be used after recovery and, in estimating the cost, this should be taken account of.

Albert Schneider said that daphnia had been suggested as a test organism and Chairman Krantz referred to the possibility of using paramecium. Both of these, however, are very sensitive to alcohol.

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A STUDY OF THE ABSORPTION AND ANTISEPTIC PROPERTIES OF SEVERAL TYPES OF IODINE OINTMENTS.

BY W. H. ZEIGLER.

This investigation was undertaken at the request of the United States Pharmacopœial Committee on Therapeutics and Pharmacologic Research.

The questions asked were: Is Stainless Ointment of Iodine (as **Unguentum Iodi Denigrescens,** N. F.) equivalent to the U. S. P. Ointment?

a. Determine the absorbability of iodine through skin.

b. Which ointment is best absorbed?

c. Are the antiseptic qualities of the two ointments identical?

The following preparations were used throughout the experiments.

Unguentum Iodi, U. S. P.
Unguentum Iodi Denigrescens, N. F.
Petroxolinum Iodi, N. F.

An ointment in which petrolatum was used as the base, and an ointment in which the Potassium Iodide was omitted were also studied.

ABSORPTION THROUGH SKIN.

Method.—Eighteen dogs and a number of human subjects were used in the experiments. The procedure consisted of applying certain amounts of the ointment under consideration, and testing the urine for iodides. Six dogs were used for each experiment. Six Gm. of the ointment were rubbed into the axillae daily and the animal bandaged securely. This was continued over a period of four to six days. The urine was tested daily by the following method:

Sulphuric acid and sodium nitrite were added to the urine after which it was shaken out with chloroform. A pink color develops if iodine is present. Witzel and Sollman (2) found that this test would give in 0.08 cc. of urine representing 0.008 mg. of iodine, a definite pink color. In the preliminary experiments it was observed that unless the animal was bandaged securely, after applying the ointment, the test for iodides would be positive in every instance. This was due to the animal licking the ointment or because of contact with the bottom of the cage.

Chloroform was used in one group to clean the site of application. In the experiments in which human subjects were used, only one application was made; the urine being collected and tested four or five times daily over a period of two days.

ANTISEPTIC QUALITIES OF THE TWO OINTMENTS.

Method.—The following method recommended by Reddish (1) of the Bureau of Chemistry, Department of Agriculture, for the testing of antiseptic salves, ointments, etc., was used.

M. aureus of normal resistance is grown at 37° C. in a special broth and transferred in this medium for 3 consecutive days. One-tenth of a cubic centimeter of this culture is added to 15 cc. of melted nutrient agar at 45° C. (1.5% agar in the above broth base), the culture is thoroughly mixed with the agar and poured into a sterile Petri dish and allowed to cool at room temperature. As soon as this inoculated agar has hardened, the salves and ointments, previously melted at 37° C., are spread over a small surface of the inoculated agar with a sterile glass rod. Melted sterile vaseline is spread on another part of the inoculated agar in the same manner and the plate inverted and incubated at 37° C. for 48 hours. A duplicate test is made at the same

time in which the melted salve or ointment is streaked on the bottom of a sterile Petri dish with a sterile glass rod and 15 cc. of nutrient agar inoculated with 0.1 cc. of *M. aureus* broth culture poured over it. The test also includes a vaseline control streaked in the same way. After being incubated it will be noted that colonies of *M. aureus* grow immediately adjacent to the vaseline control and even under or above it, according to whether it is streaked on top of the agar or on the bottom of the plate. There is no active ingredient in pure vaseline which will prevent the growth of *M. aureus*. However, in effective antiseptic salves and ointments a part of the active ingredients contained in them is absorbed into the agar and by their presence prevent the organisms present from growing. Therefore, the plate will show a clear zone around the antiseptic salve or ointment which is in marked contrast to the turbidity of the surrounding medium caused by the heavy growth of the organism.

Commenting on this method, Reddish says (1):

"When such preparations as these are used in practice, the active ingredients are held in intimate contact with the infective micro-organisms and can render them innocuous by simply preventing their activity. Since these preparations do remain in contact with the infected surfaces for long periods of time when used in practice, laboratory tests for their efficiency should simulate these conditions as nearly as possible. If an antiseptic salve, for example, does prevent the growth of micro-organisms in an infected area, it will not only prevent them from doing harm, but will also render them easy prey for the leucocytes.

"In treating infected surfaces with preparations of this nature, it is necessary that the active ingredients leave the inert base and become free to surround the infective organisms. It is only in this way that the preparation will be of benefit in preventing the growth of these micro-organisms. If the antiseptics were so securely incorporated into the inactive base that it could not become free to attack the micro-organisms or if the base were of such a nature that the antiseptic could not separate from it, the value of such preparations so far as the antiseptic ingredient is concerned would be lost. Plain 1.5% agar simulates fairly closely the conditions met in skin and wounds. It is permeable, semisolid, isotonic and constitutes a valuable laboratory means of approximating the conditions found in human and animal tissues, at least so far as the preparations under consideration are concerned."

DISCUSSION.

Witzel and Sollman (2) after a study of iodine absorption from human skin in which tincture of iodine was the principal form used, found that the amount absorbed by the normal human skin was very small.

Herzfeld and Elin (3) found that petrolatum secures the best absorption.

Bartenbach (4) found that absorption was better when lard was used as a base.

The experiments as outlined were carefully planned and executed with the following results: **Unguentum Iodi,** U. S. P. was readily absorbed, the test for iodides being positive after a single application. The same ointment made up with a base of petrolatum also was found to be as readily absorbed. The test for iodides after the application of the **Unguentum Iodi Denigrescens,** N. F., was negative.

Petroxolinum Iodi, N. F. also was used with positive results.

Unguentum Iodi without iodide of potash, while more irritating, also was readily absorbed.

ANTISEPTIC VALUE OF THE IODINE OINTMENTS.

The results obtained by the test mentioned were as follows: The U. S. P. Iodine Ointment shows complete inhibition. The N. F. Stainless Ointment of Iodine did not inhibit the growth of the organisms. The vaseline control was used throughout the test and in every instance Staphylococcus colonies were all over the plate.

CONCLUSIONS.

1. **Unguentum Iodi,** U. S. P. is readily absorbed through the skin.

2. **Unguentum Iodi Denigrescens,** N. F. is apparently not absorbed through the skin as shown by absence of iodides in the urine.

3. **Petroxolinum Iodidi,** N. F. is absorbed through the skin.

4. **Unguentum Iodi,** U. S. P. possesses antiseptic properties.

5. **Unguentum Iodi Denigrescens,** N. F. apparently does not possess antiseptic properties.

The author wishes to express his appreciation for the valuable assistance of C. B. Woods; also E. C. Hood and Dr. T. H. Byrnes of the Department of Pharmacology and Dr. R. E. Lee of the Department of Bacteriology of this college.

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(2) Witzel and Sollman, *Journ. Pharm. and Exp. Ther.* (1920), 15.

(3) Herzfeld and Elin, *Zentr. Bioch. Bioph.*, 13 (1912), 251.[1]

(4) Bartenbach, *Bioch. Bioph.*, 10 (1909), 278.[1]

LABORATORY OF PHARMACOLOGY OF THE MEDICAL COLLEGE
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CHARLESTON, S. C.

THE EFFECT OF SUNLIGHT ON CITRIC ACID IN THE PRESENCE OF FERRIC SALTS.

WITH SPECIAL REFERENCE TO THE ELIXIR OF IRON QUININE AND STRYCHNINE AND ELIXIR OF IRON QUININE AND STRYCHNINE PHOSPHATES.*

BY JOSEPH B. BURT.

This study was suggested by the investigations of Chilson[1] and of Mueller.[2] The principal reason for modification of the pharmacopœial formula for the elixir of iron, quinine and strychnine phosphates was because of the unstable character of the preparation manifested by precipitation and color changes upon standing. Chilson made a search of the literature for suggested changes and new formulas for the elixir and prepared samples in accordance with each method or modification found, without obtaining a single sample of the elixir which was entirely satisfactory. A review of the literature on the elixir of iron, quinine and strychnine shows that this preparation has also been subjected to the same criticism, and chiefly for the same reasons. In attempting to classify the suggested remedies for the incompatibility in the elixir of iron, quinine and strychnine phosphates, it

[1] From "Manual of Pharmacy," Sollman, as original articles could not be obtained.

* Scientific Section, A. PH. A., St. Louis meeting, 1927.

[1] Thesis, "Suggested Modifications of the United States Pharmacopœial Formula for Elixir of Iron, Quinine and Strychnine Phosphates," University of Wisconsin, 1914.

[2] Thesis, "The Action of Light on Solutions of Soluble Ferric Phosphate," University of Wisconsin, 1915.

becomes evident that the study of this elixir has been almost entirely empirical with the result that many of the suggestions are contradictory, and fail to overcome the difficulty. In only one case[1] is an explanation given for the formation of the precipitate, which is assumed to be a mixture of the phosphates of the alkaloids, quinine and strychnine. Some of the suggestions offered for preventing or redissolving the precipitate are to leave the elixir slightly acid in reaction,[2] to have the reaction exactly neutral,[3] to change the order of mixing,[4] to use heat while preparing,[5] to avoid heating,[6] and to employ heat to redissolve the precipitate after its formation[7]. Others suggest modification of the formula by reducing the quantity of ammonium carbonate and acetic acid used,[8] by omitting these constituents[9] and the substitution of potassium citrate,[10] or sodium citrate,[11] by the addition of citric acid,[12] and by addition of lactic acid.[13] Others suggest the use of pyrophosphate of iron[14] instead of the soluble phosphate of iron. Another suggestion recommends the use of sodium hydroxide[15] instead of ammonia water in neutralizing the finished elixir. In two instances[16] writers say that the U. S. P. formula is perfectly satisfactory, if sufficient care is used in following the directions for preparation.

Little reference is made to the change in color. One writer[17] recommends storing the elixir in small, well-filled bottles, since it is prone to become dark. Another[18] gives a formula for which it is claimed the green color will be retained, even when exposed to light. It is suggested that the color may be retained indefinitely[19] by rendering the preparation acid with hydrochloric acid. Only four references are made to the fact that preparations of this type are sensitive to light.[20]

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[1] P. Thielke, *Drug. Circ.*, 51 (1907), 305 and 423.

[2] H. C. Hughes, *Am. J. Pharm.*, 78 (1906), 417; T. A. Egan, *Drug. Circ.*, 55 (1911), 691.

[3] R. J. Fritzinger, *Drug. Circ.*, 55 (1911), 685.

[4] P. Thielke, *Drug. Circ.*, 51 (1907), 305 and 423; C. H. Ware, *Drug. Circ.*, 55 (1911), 408.

[5] T. Latham, JOUR. A. PH. A., 2 (1913), 202; "Question Box Editor," *Pharm. Era*, 35 (1906), 146.

[6] C. A. Bachman, *Proc. Wis. Ph. A.*, 7 (1886), 44; A. F. Marquier, *Proc. N. J. Ph. A.*, 39 (1911), 47; T. A. Egan, *Drug. Circ.*, 55 (1911), 691.

[7] G. W. Koch, *Drug. Circ.*, 51 (1907), 305.

[8] S. K. Sass, JOUR. A. PH. A., 1 (1912), 1251.

[9] C. A. Bachman, *Proc. Wis. Ph. A.*, 7 (1886), 44; Anon., *Natl. Drug.*, 40 (1910), 115; A. F. Marquier, *Proc. N. J. Ph. A.*, 39 (1911), 47; O. J. Cloughly, JOUR. A. PH. A., 2 (1913), 1004; T. Latham, JOUR. A. PH. A., 2 (1913), 202; G. W. Beringer, *Am. J. Pharm.*, 85 (1913), 303; *Editor*, "Notes & Queries," *Drug. Circ.*, 57 (1913), 461.

[10] G. W. Beringer, *Am. J. Pharm.*, 85 (1913), 303; G. C. Diekman, *Drug. Circ.*, 55 (1911), 631; S. A. Sharp, PROC. A. PH. A., 58 (1910), 73.

[11] C. A. Bachman, *Proc. Wis. Ph. A.*, 7 (1886), 44; G. Bachman, *Drug. Circ.*, 57 (1912), 62.

[12] Anon., *Natl. Drug.*, 40 (1910), 115.

[13] W. L. Cliffe, *Drug. Circ.*, 57 (1913), 199.

[14] C. A. Bachman, *Proc. Wis. Ph. A.*, 7 (1886), 44; Anon., *Natl. Drug.*, 40 (1910), 115.

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[16] F. Hemm, *Proc. Mo. Ph. A.* (1906), 52.

[17] W. C. Mittelbach, *Am. J. Pharm.*, 71 (1889), 495.

[18] A. F. Marquier, *Proc. N. J. Ph. A.*, 39 (1911), 47.

[19] W. R. White, JOUR. A. PH. A., 2 (1913), 939.

[20] W. C. Mittelbach, *Am. J. Pharm.*, 71 (1889), 495; A. F. Marquier, *Proc. N. J. Ph. A.*, 39 (1911), 47; W. R. White, JOUR. A. PH. A., 2 (1913), 939; M. B. Chittick, *Pharm. Era*, 57 (1923), 635.

One writer[1] reports the formation of a gas in the elixir of iron, quinine and strychnine.

In the course of the investigation by Mueller,[2] a study of the behavior of solutions of soluble ferric phosphate was made. In order to simplify the problem, and at the same time approach it in a more scientific manner, solutions or suspensions of citric acid, of sodium phosphate and of ferric hydroxide (the ingredients entering into the manufacture of soluble ferric phosphate) were prepared, and also solutions or suspensions of the following combinations were made: (1) ferric hydroxide and citric acid; (2) ferric hydroxide and sodium phosphate; (3) citric acid and sodium phosphate and (4) ferric hydroxide, citric acid and sodium phosphate. Since the effect of light was believed to have some influence upon the precipitation and color changes which occurred, portions of these solutions were exposed to sunlight. In each case where citric acid and ferric hydroxide occurred in the same mixture, the evolution of a gas was observed, and the iron was reduced. Samples of the gas were collected and tests revealed the presence of carbon dioxide. A similar test was made using ferrous hydroxide and citric acid, but no gas was produced. It was the opinion of Mueller that the fundamental difficulty in the elixir of iron, quinine and strychnine phosphates must be looked for in the mixtures of chemicals known as soluble ferric phosphate, and that a part of the difficulty is due to the action of sunlight upon citric acid in the presence of ferric iron.

A review of the literature covering the effect of sunlight on citric acid and other acids in the presence of metallic compounds which are easily reduced, reveals that this type of reaction was first reported by Liebig[3] in 1859, who observed that when tartaric acid was decomposed by manganese dioxide and sunlight "carbonic acid and a copper-reducing substance" were formed, and that under similar conditions malic acid was changed to "acetaldehyde and carbonic acid" and that citric acid was converted into "acetone and carbonic acid."

W. Seekamp[4] found in 1893 that a similar decomposition was produced by sunlight if uranic oxide were added to solutions of citric acid. He explained the decomposition by assuming that acetone, oxalic acid and carbon dioxide were first formed, and that the oxalic acid was subsequently oxidized, producing carbon dioxide and water.

Other investigators have observed similar effects of sunlight upon citric acid, but they are not entirely in agreement as to the products formed. C. Neuberg[5] exposed solutions of a number of organic compounds to sunlight in the presence of uranic oxide and its salts. In the case of citric acid he observed that the uranium compound had been reduced and reported that the solution had a reducing effect upon Fehling's solution and had developed a characteristic fruit-like odor. A. Benrath,[6] in 1912, reported that in the presence of ferric nitrate and nitric acid, citric acid was decomposed by sunlight, and that the reaction mixture was found

[1] R. E. Terry, *Midland Drug.*, 49 (1915), 108.

[2] Thesis, "The Action of Light on Solutions of Soluble Ferric Phosphate," University of Wisconsin (1915).

[3] *Annalen der Chemie*, 113, 1.

[4] *Ibid.*, 278, 373.

[5] "Catalytic Reactions of Sunlight," *Biochem. Zeitschrift*, 27 (1910), 305.

[6] *Chemisches Centralblatt* (1912), II, 1342.

to contain acetone, acetic acid, hydrocyanic acid, formaldehyde and nitrous oxide. Later, in 1917, the same investigator[1] reported the formation of acetone and some formaldehyde, where ferric alum had been used as the ferric salt. G. Ciamucian and P. Silber[2] reported in 1913 that a 5% solution of citric acid, when placed in contact with oxygen and exposed to sunlight all summer, produced acetone and carbon dioxide, and that they were unable to find any other products of the reaction. According to J. Plotnikow,[3] if oxygen is present and an iron salt is used, citric acid produces acetone, carbon dioxide and water.

EXPERIMENTAL.

I.—In order to determine whether citric acid would completely dissolve ferric hydroxide, when the two were in molecular proportions, producing a solution of normal ferric citrate, a solution of ferric chloride was prepared which upon analysis was found to contain 0.21244 Gm. per cc. A solution of citric acid was also prepared, containing 0.20636 Gm. of the crystalline acid per cc. A sufficient quantity of the solution of ferric chloride to represent 12.2061 Gm. of ferric hydroxide (which is the chemical equivalent of 24 Gm. of citric acid) was precipitated with ammonia water, and washed until free from chlorides and the washings failed to give an alkaline reaction. A sufficient quantity of the standard solution of citric acid to represent 24 Gm. of citric acid was then added to the magma of ferric hydroxide, and the mixture diluted to approximately 1500 cc. After standing 24 hours, a considerable quantity of undissolved ferric hydroxide remained. Exactly 1 Gm. of citric acid was added each day until the magma finally was completely dissolved, and the solution finally contained 27 Gm. of citric acid instead of the 24 Gm. originally added. This shows that ferric hydroxide does not dissolve completely in solutions of citric acid, when the two are present in exactly molecular proprotions, and that an excess of the acid must be present to effect solution.

II.—In order to determine the effect of the excess of citric acid upon the reaction of the solution when exposed to sunlight, a solution was prepared containing 24 Gm. of citric acid per liter, and a quantity of ferric hydroxide considerably less than the weight chemically equivalent to the citric acid. (The ferric hydroxide was obtained from approximately 12 Gm. of solid ferric chloride, which was roughly weighed. Because of the original moisture contained in the salt, and that absorbed during the weighing, the quantity of ferric hydroxide represented was correspondingly less than the weight chemically equivalent to the citric acid used.) Six portions of 25 cc. each of the solution were divided into three groups of two each. The first two were exposed to sunlight in the original condition. Another two portions were rendered neutral in reaction by the addition of ammonia water, and to the third group, just half of the ammonia water required for neutralization was added. The six portions were each held over chloroform in 100-cc. Lunge nitrometers, and exposed to sunlight for two days.

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[1] *Jour. für prak. Chem.*, 204, 190.

[2] *Chemisches Centralblatt* (1913), II, 136.

[3] *Lehrbuch der Photochemie*, 1920, 538.

		Cc. of gas.	Appearance of solution.
Acid solutions	I	18.5	Colorless
	II	20.3	Colorless
Half-neutralized solutions	I	9.7	Colorless
	II	9.8	Colorless
Neutral solutions	I	none	Some color retained, but lighter
	II	none	Some color retained, but lighter

This shows that the extent of the reaction is dependent upon the excess citric acid in the solution, since the quantity of gas collected varies almost in direct proportion with the quantity of free acid, and a neutral reaction the decomposition of the citric acid.

III.—When the gas collected in Experiment II was passed through lime water, the liquid became cloudy, showing the presence of carbon dioxide. When another portion of the gas was passed into a strong solution of potassium hydroxide, it was completely absorbed, showing that carbon dioxide was the only constituent of the gas. Upon distillation of the exposed solution, the distillate was found to give a pronounced iodoform reaction, indicating the presence of acetone. This solution was also tested for formaldehyde, since Benrath[1] had reported the formation of formaldehyde in a somewhat similar reaction mixture. The resorcinol test and the ring test, employing sulphuric acid and a 1% aqueous solution of phenol, were used, and both gave negative results.

The undistilled portion of the exposed solution was to be examined principally for oxalic acid and other acids, since Seekamp[2] explained the reaction by assuming that oxalic acid was produced as an intermediate product as a result of the decomposition of the citric acid. Upon treatment of the solution with hydrogen suphide to precipitate the iron, the resulting sulphide was found to pass directly through the filter and appeared to be colloidal in character. Evaporation of the mixture to a small volume failed to overcome this difficulty, and it was found to be impossible to obtain a clear solution free from iron for these tests. However, other experiments to be described bear out the assumption that carbon dioxide, acetone and water are the only products formed by the decomposition of the citric acid.

IV.—Four 100-cc. portions, A, B, C and D, of the original solutions used in the experiment described in Section II were placed in flasks so arranged that any gas evolved would displace an equal volume of water which would flow into a graduated cylinder and could be roughly measured. Portions A and B were exposed in 300-cc. Pyrex glass flasks, and 240-cc. quartz flasks were used for C and D. After exposure to sunlight for two days, they appeared to be completed, as no further increase in the volume of gas was observed upon additional exposure. The total volumes obtained were:

A (glass)	B (glass)	C (quartz)	D (quartz)
110 cc.	70 cc.	100 cc.	105 cc.

At this point the solutions were colorless, indicating the reduction of the iron. It was observed, however, that after opening the flasks and allowing the solutions to

[1] *Chem. Centralblatt* (1912), II, 1342.
[2] *Annalen der Chemie*, 278, 373.

stand in diffused light for several days they gradually regained a brown color. In order to determine whether such solutions, containing ferric iron as a result of reoxidation upon contact with air, would react a second time, the solutions were exposed again. While the total volumes of gas show a wide variation, it is clear that all four portions reacted. This would seem to indicate that the end-point of the reaction was brought about by the complete reduction of the iron, rather than by the exhaustion of the excess citric acid.

Cc. gas. A (glass)	Cc. gas. B (glass)	Cc. gas. C (quartz)	Cc. gas. D (quartz)
790	315	170	370

Continued exposure failed to give higher readings. It is probable that the apparatus used for Solutions B and C were defective, and permitted escape of some of the gas during the early stages of the reaction.

V.—In order to determine the ratio of carbon dioxide to the acetone produced, a solution was prepared containing 49.2645 Gm. of citric acid per liter and a quantity of ferric hydroxide considerably less than that weight chemically equivalent (in molecular proportions). Four portions of 240 cc. each (the capacity of the quartz flasks) were exposed to sunlight in the apparatus described in Section IV, two portions, A and B in Pyrex glass flasks and the other two, C and D in quartz flasks. At the end of a week the reaction had apparently gone to completion. The volumes of gas collected were as follows:

Cc. gas. A (glass)	Cc. gas. B (glass)	Cc. gas. C (quartz)	Cc. gas. D (quartz)
1510	1500	1180	1190

The solutions were then distilled and the acetone determined by Goodman's variation of the Messenger Method.[1] For the purpose of comparison, the theoretical volume of carbon dioxide has been calculated from the acetone, assuming that three molecules are produced for each molecule of acetone. These calculations are based upon a pressure of 760 mm. of mercury, and at the temperature of 30° C., which was assumed to be the average.

	Gm. citric acid by analysis.	Gm. acetone by analysis.	Eq. to citric acid, Gm.	Eq. to CO_2 at 30° C., cc.	CO_2 actually collected.
A	11.8245	1.1015	3.9846	1415.28	1510
B	11.8245	1.0885	3.9425	1398.58	1500
C	11.8245	0.8937	3.2371	1148.28	1180
D	11.8245	0.9037	3.2732	1032.13	1190

In each case the actual quantity of carbon dioxide obtained exceeds slightly the theoretical quantity. This may be explained by the fact that these experiments were undertaken during very hot weather, and the temperature in the direct sunlight was no doubt at times higher than the assumed 30° C. Any expansion of the gas would cause a corresponding volume of water to be displaced and in this way increase the reading. Since the theoretical volume of carbon dioxide is calculated with the assumption that three molecules are produced for each molecule of acetone, the results obtained give confirmation of the correctness of this view.

[1] *J. Am. Chem. Soc.*, 42, 39.

VI.—An attempt was made to check the accuracy of the gasometric determination of the carbon dioxide by absorbing it in a strong solution of potassium hydroxide as it was produced by the reaction. The solution was to be titrated with acid, using phenolphthalein and methyl orange as indicators. A series of twelve solutions were prepared and exposed as before, but in all cases the results obtained in the determination of the carbon dioxide showed such wide variation and were so low that they have been omitted here. The method chosen is apparently applicable only where small quantities of carbonate are present in the solution of the alkali. However, the quantity of acetone produced was carefully determined for each sample, and the equivalent quantity of citric acid calculated by the factor $\frac{210.11}{58.06}$ or 3.6188. In the solutions used for these experiments, the iron content was known. The assumption that the iron is reduced to the ferrous condition and forms ferrous citrate, $Fe_3(C_6H_5O_7)_2$, permits a comparison of the quantity of citric acid left unchanged to the quantity of hydroxide contained in the solution, in order to determine whether the amount of ferric hydroxide is sufficient, when reduced, to hold the citric acid in combination as ferrous citrate. The ratio $\frac{3Fe(OH)_3}{2(H_3C_6H_5O_7-H_2O)}$ is $\frac{320.58}{420.22}$ or 0.76287. This factor permits calculation from the citric acid of the corresponding weight of ferric hydroxide, which, when reduced, would be required to combine with a given quantity of citric acid as ferrous citrate. These values, together with the quantity of citric acid originally present, the quantity decomposed, and the quantity unchanged are compared with the quantity of ferric hydroxide actually present in the following table. As before, the samples labelled A and B were exposed in Pyrex glass containers, and those labelled C and D were exposed in quartz flasks.

		Gm. total citric acid in 100 cc.	Gm. citric acid decomposed per 100 cc.	Gm. citric acid left unchanged per 100 cc.	$Fe(OH)_3$ required to combine as $Fe_3(C_6H_5O_7)_2$ per 100 cc.	$Fe(OH)_3$ actually present per 100 cc.
I.	A	2.7000	1.1671	1.5329	1.1693	1.1421
	B	2.7000	1.4266	1.2744	0.9722	1.1421
	C	2.7000	1.2883	1.4117	1.0769	1.1421
	D	2.7000	1.2713	1.4287	1.0899	1.1421
II.	A	1.4000	0.9340	0.4660	0.3555	0.6103
	B	1.4000	0.9488	0.4512	0.3442	0.6103
	C	1.4000	1.1110	0.2890	0.2204	0.6103
	D	1.4000	1.0947	0.3053	0.2329	0.6103
III.	A	1.4000	0.6119	0.7881	0.6012	0.6103
	B	1.4000	0.5898	0.8102	0.6180	0.6103
	C	1.4000	0.5714	0.8286	0.6321	0.6103
	D	1.4000	0.5677	0.8323	0.6349	0.6103

It will be noted that in samples IA, IIIB, IIIC and IIID, the reaction has apparently gone beyond the end-point indicated by the formation of ferrous citrate. The only explanation which may be offered for this is the formation of basic salts. while in the other samples, where the quantity of ferric hydroxide present is more than sufficient to form ferrous citrate, it is probable that acid salts are formed.

SUMMARY AND CONCLUSIONS.

As a result of the experiments conducted, certain conclusions may be drawn. The reaction which occurs appears to be a photochemical decarboxyllation and oxidation of the citric acid at the expense of the ferric iron, in accordance with the equation:

$$\begin{array}{l} CH_2COOH \\ | \\ C(OH)COOH + O \\ | \\ CH_2COOH \end{array} \longrightarrow \begin{array}{l} CH_3 \\ \\ CO + 3CO_2 + H_2O \\ \\ CH_3 \end{array}$$

In all cases there was a reduction of the iron to the ferrous condition. There was no precipitation observed as reported by Mueller,[1] who found that metallic iron had been produced.[2] The end-point of the reaction is not a very definite one, since standing of the solution in diffused light results in a partial re-oxidation of the iron, which permits resumption of the reaction if the solution be again exposed to sunlight. The extent of the reaction depends upon the excess of citric acid in the solution, and a neutral solution is not affected by sunlight. This seems to make it plausible that only the free acid is attacked, although it should be noted that the reduction of the iron, which results in a lowering of its combining power, liberates free acid in excess of that present as free acid in the original solution.

The results of the experiment described in Section V serve as a basis for the conclusion that three molecules of carbon dioxide are produced for each molecule of acetone. Failure to find formaldehyde in the distillate confirms the belief that carbon dioxide, acetone and water are the only products resulting from the decomposition of the citric acid.

Evidently the light required for this reaction need not necessarily be rich in the ultraviolet. A comparison of the results shows that in a majority of the experiments, the solutions exposed in glass containers produced slightly more acetone and carbon dioxide, when compared volume for volume and for the same length of exposure, than the solutions exposed in quartz.

In so far as this reaction has a bearing upon the elixir of iron, quinine and strychnine, and the elixir of iron, quinine and strychnine phosphates, while the reaction is only one phase of the incompatibility occurring in these preparations, yet certain generalizations may be formulated. The color change in these preparations indicates that the iron has been reduced, and if there is any appreciable quantity of citric acid in excess, and the solution be exposed even to diffused light for a long period of time, there is a possibility of the citric acid gradually breaking down into acetone, carbon dioxide and water. Certainly rendering these preparations acid in order to stabilize them, as has been suggested, would have the opposite effect. On the other hand a slight alkaline reaction will result in the precipitation of the alkaloids and some of the iron. Apparently these preparations require as nearly neutral a reaction as can be obtained. These elixirs should be stored in

[1] Thesis, University of Wisconsin (1915).

[2] It is possible that the reduction of the iron to the metallic state was the result of side reactions induced by the chloroform, or more probably by the mercury in the trap.

amber glass containers, and it is recommended that they be dispensed on prescriptions in the same type of container, instead of the usual prescription bottle.

A METHOD FOR THE QUANTITATIVE ESTIMATION OF SULPHUR COMBINED AS SULPHIDES IN POTASSA SULPHURATA (LIVER OF SULPHUR).*

BY CHARLES H. ROGERS.

"Sulphurated Potassa is a mixture composed chiefly of potassium polysulphides and potassium thiosulphate and contains not less than 12.8 per cent of sulphur (S) in combination as sulphides."—U. S. Pharmacopœia, Tenth Revision.

PREPARATION AND DESCRIPTION OF POTASSA SULPHURATA.

This product is made by thoroughly triturating one part of sublimed sulphur with two parts of potassium carbonate, placing the mixture in a covered crucible, and heating until the mass is in a state of perfect fusion. The melt is then poured upon a slab and when cool is broken into pieces of convenient size and stored in a well-stoppered bottle.

The composition of the product thus obtained varies according to the amount of heat employed. Any of the following reactions may occur.[1]

1. $3K_2CO_3 + 6S_2 = 2K_2S_5 + K_2S_2O_3 + 3CO_2$.
2. $3K_2CO_3 + 4S_2 = 2K_2S_3 + K_2S_2O_3 + 3CO_2$.
3. $4K_2CO_3 + 5S_2 = 3K_2S_3 + K_2SO_4 + 4CO_2$.

Therefore, it will be noted that sulphurated potassa is not a definite chemical compound but a mixture of the polysulphides, the sulphate and the thiosulphate of potassium.

The synonym, liver of sulphur, alludes to the liver-brown color of the freshly prepared material. Upon exposure to air sulphurated potassa absorbs moisture and carbon dioxide and is changed from a brown to a greenish yellow color, and eventually to a gray mass, which consists of potassium carbonate, potassium thiosulphate and potassium sulphate. This decomposition renders it nearly worthless as a therapeutic agent.

ASSAY OF POTASSA SULPHURATA.

U. S. P. X METHOD.

"Dissolve 1 Gm. of crystallized copper sulphate accurately weighed, in 15 cc. of distilled water and 1 Gm. of Sulphurated Potassa accurately weighed in 10 cc. of distilled water, in a flask. Add the copper sulphate solution to the sulphurated potassa solution in a stoppered flask, shake for a few minutes and filter. Acidulate the filtrate with acetic acid, refilter if necessary and add an equal volume of hydrogen sulphide T. S. No black precipitate is produced."

The result obtained by this method of assay indicates only whether the compound is above or below the official requirement. This test does not give results

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* Scientific Section, A. PH. A., St. Louis meeting, 1927.

[1] "Principles of Pharmacy," H. V. Arny, Second edition, page 412.

that can be interpreted in terms of sulphur combined as sulphides in the sample. A lesser amount of sulphur combined as sulphides than required by the U. S. P. results in part of the copper sulphate being present in the filtrate, from which the copper ions can be precipitated as black copper sulphide upon the addition of hydrogen sulphide T. S.

PROPOSED METHOD OF ASSAY OF SULPHURATED POTASSA.

Apparatus required:

1. Two 150-cc. glass-stoppered flasks.
2. Two 400-cc. beakers.
3. One 25-cc. standard pipette.
4. Two 5-cm. chemical funnels and filter paper.
5. Hydrogen sulphide generator.
6. Suction filter, drying oven and muffle furnace.
7. Two Gooch crucibles.

The crucibles must be carefully prepared in order to facilitate filtration. A small quantity of soaked asbestos fibre, sufficient to form a layer of the fibre about one cm. thick on the bottom of the crucible, is placed in a freshly ignited and cooled Gooch crucible, the suction turned on and the fibre pressed down gently to form a cup-shaped layer. If too much pressure is used the layer becomes too firm and the filtration period is greatly lengthened. The asbestos is washed with distilled water, then with alcohol, and ether and finally dried in an oven. The crucibles are placed in a muffle furnace and heated to constant weight.

Reagents:

1. Copper Sulphate Solution.—Dissolve about 15 Gm. of crystallized copper sulphate accurately weighed, in sufficient distilled water to make 250 cc. at 20° C., using a standard volumetric flask.

Procedure:

The method given below permits two or more determinations being run at the same time.

Dissolve about 1 Gm. of sulphurated potassa, accurately weighed, in 15 cc. of distilled water in a stoppered flask. Add 25 cc. of the standard copper sulphate solution, stopper the flask, agitate for a few minutes and filter. Rinse the flask thoroughly with warm distilled water and pass the rinsings through the filter. Wash the precipitate and filter thoroughly with warm distilled water until all of the excess copper sulphate has been removed. Test the washings with ammonium hydroxide for the presence of copper ion. When they no longer contain any copper ion, slightly acidulate the filtrate with diluted acetic acid and warm to about 70° or 80° C. Slowly pass hydrogen sulphide through the filtrate until the copper ions have been completely precipitated as black copper sulphide and which collect at the bottom of the container. This operation requires at least ten minutes for the complete precipitation of the copper ions. It should be noted that copper ion is not precipitated by thiosulphate ion. With concentrated solutions a small amount of free sulphur is precipitated which, as will be shown later, does not affect the accuracy of the determination. Filter off the precipitate through a tared Gooch crucible and wash thoroughly with distilled water. Test the filtrate with ammonium hydroxide for the presence of copper ion and, if absent, wash the precipitate first with alcohol and then with ether. If a positive test is obtained it is quite evident that the copper ions have not been completely precipitated and more hydrogen sulphide should be passed into the liquid. When the precipitation is complete, dry the washed copper sulphide in a hot-air oven to remove moisture. Ignite the dried precipitate to constant weight in a muffle furnace at dull red heat. From two to three hours are required for the complete conversion of the copper sulphide to copper oxide.

In the method described all of the sulphur combined as sulphides in the sample is precipitated as copper sulphide by the copper ions. The excess copper ions then pass through the filter and are precipitated as copper sulphide by hydrogen sulphide. At this point free sulphur is also thrown down, a condition which makes it impossible to dry and weigh the copper sulphide obtained from the excess copper ions. The very tedious task of washing the precipitate free from sulphur leads to many errors and loss of time. Therefore, it was thought expedient to convert the copper sulphide to copper oxide by ignition and burn up the sulphur during the operation.

In order to express the per cent of sulphur combined as sulphides in a sample of sulphurated potassa, it is necessary to obtain the copper sulphide equivalent of 25 cc. of the standard copper sulphate solution. The number of Gm. of copper sulphate in 25 cc. of the standard solution is multiplied by the factor 0.3829, thus giving the equivalent in terms of copper sulphide. The copper sulphate content of the standard copper sulphate solution was also determined quantitatively and, where clean, uneffloresced crystals had been used in making the solution, was found to check very closely with the weighed amount used in making the standard solution. The copper oxide from which the final weighing is obtained also must be expressed in terms of copper sulphide and hence the weight of the residue is multiplied by the factor 1.2018. This weight is subtracted from the copper sulphide equivalent of the 25 cc. of standard copper sulphate solution and the difference is the amount of copper sulphide which has been precipitated by the interaction of copper ions of the standard copper sulphate solution and the sulphide ions present in the solution of sulphurated potassa. This amount of copper sulphide is then calculated to combined sulphur by multiplying by the factor 0.33525, the product being the actual amount of sulphur combined as sulphides in the sample. The per cent of sulphur combined as sulphides is obtained by multiplying the weight of sulphur combined as sulphides by 100 and dividing the product by the original weight of sulphurated potassa used for analysis.

Example: 1.0988 Gm. sulphurated potassa taken for analysis.
1.50274 Gm. copper sulphate present in 25 cc. of standard copper sulphate solution.
$1.50274 \times 0.3829 = 0.5754$ Gm. equivalent in terms of copper sulphide.
0.1310 Gm. weight of copper oxide residue.
$0.1310 \times 1.2018 = 0.1574$ Gm. equivalent in terms of copper sulphide.
0.5754 Gm.
0.1574 Gm.

0.4180 Gm. copper sulphide precipitated by sulphide ions present in the solution of potassa sulphurata.

$0.4180 \text{ Gm.} \times 0.33525 = 0.13401$ Gm. sulphur combined as sulphides in the sample.

$\frac{0.13401 \text{ Gm.} \times 100}{1.0988 \text{ Gm.}} = 12.75$ per cent of sulphur combined as sulphides in the sample of sulphurated potassa.

EXPERIMENTAL RESULTS OBTAINED.

SAMPLE 1.

Determination 1. 15.88 per cent of sulphur combined as sulphides.
Determination 2. 15.91 per cent of sulphur combined as sulphides.
Determination 3. 15.26 per cent of sulphur combined as sulphides.
Determination 4. 15.19 per cent of sulphur combined as sulphides.

SAMPLE 2.

Determination 1.	14.11	per cent	of	sulphur	combined	as	sulphides.
Determination 2.	14.12	per cent	of	sulphur	combined	as	sulphides.
Determination 3.	14.19	per cent	of	sulphur	combined	as	sulphides.
Determination 4.	14.44	per cent	of	sulphur	combined	as	sulphides.
Determination 5.	14.17	per cent	of	sulphur	combined	as	sulphides.
Determination 6.	14.29	per cent	of	sulphur	combined	as	sulphides.
Determination 7.	14.35	per cent	of	sulphur	combined	as	sulphides.
Determination 8.	14.39	per cent	of	sulphur	combined	as	sulphides.

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A SOURCE OF ERROR IN THE ASSAY OF BELLADONNA PLASTER.*

BY JOSEPH L. MAYER.[1]

Assays of belladonna plasters having yielded low results, samples of the same lot were submitted to me for analysis and the results showed that the material fully met the U. S. P. standard of "not less than 0.25 per cent and not more than 0.30 per cent of the alkaloids of belladonna leaves." I conducted a series of experiments to determine the cause of the low results obtained by the other analyst.

The following method for the assay of Belladonna Plaster official in U. S. P. X, page 129, was employed in making the analyses:

Introduce 10 Gm. of Belladonna Plaster into a 100-cc. flask. (If the plaster is spread on fabric, cut the portion to be assayed into strips, weigh accurately and introduce it into the flask.) Now add 50 cc. of chloroform, and shake the mixture until the plaster is dissolved. Pour the chloroform solution into a 250-cc. beaker, and wash the cloth upon which the plaster was spread with two successive portions of 25 cc. each of chloroform, adding the washings to the chloroform solution in the beaker. Then wash this cloth with 80 cc. of alcohol containing 1 cc. of ammonia T. S., and pour the washings into the chloroform solution in the beaker. Stir the mixture gently, and allow it to stand until the rubber has separated into a compact mass. Dry the cloth upon which the plaster was spread, weigh it, and subtract its weight from the first weight of the plaster. Pour the chloroform-alcohol solution into a 250-cc. separator, rinse the beaker and rubber with 10 cc. of alcohol, and add the rinsing to the separator. Completely extract the alkaloids from the chloroform-alcohol solution by shaking out repeatedly with weak sulphuric acid. Collect the acid washings in a separator, and add ammonia T. S. until the solution is decidedly alkaline to litmus paper, and completely extract the alkaloids by shaking out repeatedly with chloroform. Filter the chloroform solution through a pledget of purified cotton, evaporate it to dryness and dissolve the alkaloids from the residue in exactly 5 cc. of tenth-normal sulphuric acid and titrate the excess of acid with fiftieth-normal potassium hydroxide.

The U. S. P. on page 453, "Proximate Assays," "General Directions for Alkaloidal Assays," under the heading "Shaking Out with Acid," states that

"After extracting with the several portions of acid, test a few drops of the last portion used, for the presence of alkaloid. Extraction must be continued until not more than a very faint cloudiness results upon the addition of a drop of mercuric potassium iodide T. S. or, in the case of hydrastis or colchicum, upon the addition of a drop of iodine T. S."

* Presented at meeting of New York Pharmaceutical Association, June 1928.

[1] Chemical Laboratory, Brooklyn College of Pharmacy.

In the assay of belladonna plaster the sample is dissolved in 100 cc. of chloroform, the cloth washed with 80 cc. of alcohol containing 1 cc. of ammonia T. S., after which the rubber is washed with 10 cc. of alcohol making a total volume of 191 cc. of which 80 cc. or about 42 per cent is alcohol. The next step in the assay is to shake out the alkaloids from this mixture with acid, the exact wording being "completely extract the alkaloids from the chloroform-alcohol solution by shaking out repeatedly with weak sulphuric acid."

"Completely extract" means that "extraction must be continued until not more than a very faint cloudiness results upon the addition of a drop of mercuric potassium iodide T. S."

Allen (Commercial Organic Analysis, Vol. VI, Fourth Edition, 1912, page 191) says that in testing for alkaloids with Mayer's Reagent (mercuric potassium iodide T. S.) "the solution to be tested must be not more than slightly alcoholic" and "the precipitates yielded by alkaloids with Mayer's solution are more or less soluble in alcohol." Allen in the same volume on page 189 under precipitation of alkaloids with Wagner's Reagent (Iodine T. S.) says: "In alcoholic solutions the precipitates are sometimes not formed or are deposited very slowly."

Each time the chloroform-alcohol solution is shaken "with weak sulphuric acid" some alcohol is extracted and in an effort to determine to what degree the presence of alcohol interferes with test for alkaloids in the acid shake-out the following work was carried out:

About 2 cc. of the acid shake-out were placed on a watch glass, and a few drops of Mayer's Reagent added. There was neither precipitate nor turbidity indicating the absence of alkaloids. Another 2-cc. portion of this same acid shake-out was evaporated on a steam-bath until the alcohol was expelled, cooled and Mayer's Reagent added. The result was a heavy precipitate.

Another 2-cc. portion of this acid shake-out was tested with diluted Wagner's Reagent made by diluting 1 volume of Wagner's Reagent with 4 volumes of water. The reagent yielded a positive reaction.

Another 2-cc. portion of this acid shake-out evaporated on the steam-bath until the alcohol expelled was tested with diluted Wagner's Reagent. The result was a heavy precipitate.

This acid shake-out was discarded and the chloroform-alcohol mixture shaken with another portion of diluted sulphuric acid which was tested for alkaloids before and after evaporation. Shaking out with fresh portions of diluted acid was continued until the acid shake-outs were free from alkaloids, the results being as follows:

Second Shake-out

Before Evaporation of Alcohol
- Mayer's Reagent—No reaction
- Wagner's Reagent—Distinct reaction

After Evaporation of Alcohol
- Mayer's Reagent—Heavy reaction
- Wagner's Reagent—Heavy reaction

Third Shake-out

Before Evaporation of Alcohol
- Mayer's Reagent—No reaction
- Wagner's Reagent—Faint reaction

After Evaporation of Alcohol
- Mayer's Reagent—Pronounced reaction
- Wagner's Reagent—Pronounced reaction

Fourth Shake-out

Before Evaporation of Alcohol
- Mayer's Reagent—No reaction
- Wagner's Reagent—No reaction

After Evaporation of Alcohol
- Mayer's Reagent—Faint reaction
- Wagner's Reagent—Distinct reaction

Fifth Acid Shake-out

Before Evaporation of Alcohol
- Mayer's Reagent—No reaction
- Wagner's Reagent—No reaction

After Evaporation of Alcohol
- Mayer's Reagent—Very faint reaction
- Wagner's Reagent—Distinct reaction

Sixth Acid Shake-out

Before Evaporation of Alcohol
Mayer's Reagent—No reaction
Wagner's Reagent—No reaction
After Evaporation of Alcohol
Mayer's Reagent—No reaction
Wagner's Reagent—Faint reaction

Seventh Acid Shake-out

Before Evaporation of Alcohol
Mayer's Reagent—No reaction
Wagner's Reagent—No reaction
After Evaporation of Alcohol
Mayer's Reagent—No reaction
Wagner's Reagent—No reaction

These results clearly indicate that if Mayer's Reagent is applied to the acid shake-outs from the chloroform-alcohol mixture in the assay of belladonna plaster without evaporating the alcohol the absence of alkaloids is indicated, even in the first separation, shaking out with acid is discontinued while a large quantity of alkaloid is still present and as a consequence low results are obtained.

The U. S. P. Sub-Committee on Proximate Assays should include in the "General Directions for Alkaloidal Assays" a statement that in testing the acid shake-outs in the assay of belladonna plaster the alcohol should be evaporated on a steam-bath and the material cooled before testing with Mayer's Reagent.

SUMMARY.

1. In the assay of belladonna plaster low results will be obtained if the acid shake-outs are tested for freedom from alkaloids with Mayer's Reagent unless the alcohol is evaporated.

2. It is imperative to evaporate the alcohol from these acid shake-outs before testing for alkaloids with Mayer's Reagent due to the fact that in the presence of alcohol even the first shake-out fails to yield an alkaloidal reaction thus indicating the absence of alkaloids where a large amount is present.

3. The U. S. P. Sub-Committee on Proximate Assays should incorporate a statement under "General Directions for Alkaloidal Assays" calling attention to the necessity of evaporating the alcohol from the acid shake-outs in the assay of belladonna plaster before testing for alkaloids with Mayer's Reagent.

The author takes this opportunity of acknowledging his indebtedness to his assistant, Mr. Berl S. Alstodt, for the considerable aid rendered in making many of the tests and assays.

THE ESTIMATION OF OIL IN EXTRACT OF LEMON.

A DISCUSSION OF THE PRECIPITATION AND POLARIMETRIC METHODS: THE INFLUENCE OF TEMPERATURE AND AGING UPON THE LATTER.*

BY C. V. NETZ.

The regulations of the U. S. Department of Agriculture define Lemon Extract as "The flavoring extract prepared from oil of lemon, or from lemon peel, or both and containing not less than 5% by volume of oil of lemon." At the present time all lemon extracts (except terpeneless extracts) are manufactured by dissolving the oil in alcohol of sufficient strength, with the optional addition of a small amount

* Scientific Section, A. PH. A., St. Louis meeting, 1927.

of lemon peel color or other color. The U. S. P. "Tinctura Limonis" does *not* conform to these standards.

The sale of "Terpeneless" extract of lemon containing not less than 0.2% of citral by weight, is permitted by the regulations providing it is properly labeled so that in the mind of the purchaser, there is no confusion with a pure oil extract. This extract is made by dissolving citral in diluted alcohol, by shaking oil of lemon with diluted alcohol, or by dissolving terpeneless oil of lemon in diluted alcohol. Such an extract has the advantage of permanency. Terpeneless extract will not be considered in this paper.

Two methods for the estimation of the amount of oil in lemon extract are recognized by chemists, *i. e.*, the precipitation and the polarimetric. The accuracy of each under varying conditions, and especially in the hands of inexperienced analysts, has often been questioned, hence the investigations embodied in this paper. Results obtained by these methods express volume of oil in volume of extract.

PRECIPITATION METHOD.

The Precipitation Method involves the measurement of the volume of oil that separates from a definite volume of extract (20 cc.) upon dilution with water. The extract is measured into a Babcock milk bottle, diluted with water and centrifuged. The per cent of oil in the extract is read directly from the number of units occupied by the separated oil in the neck of the bottle, plus the factor 0.4 to correct for unseparated oil.

The object of the investigations in connection with this method centered upon two phases: First, (*a*) whether the entire length of the column of separated oil should be measured, or (*b*) the actual volume only, and secondly, the accuracy of the correction factor 0.4%.

A number of extracts of various strengths were manufactured in the laboratory and assayed for oil according to this method, with the results tabulated below. Five per cent extracts made from various oils are listed first, then extracts of various strengths made from oil No. 1-A.

TABLE I.

5% EXTRACTS.

Oil.	Actual reading of separated oil in duplicate detns.		Per cent of oil after addition of correction factor.	
No. 1-A	4.5 units	4.6 units	4.9%	5.0%
No. 1-B	4.6 units	4.5 units	5.0%	4.9%
No. 2	4.4 units	4.6 units	4.8%	5.0%
No. 4	4.6 units	4.6 units	5.0%	5.0%
No. 6	4.7 units	4.8 units	5.1%	5.2%

TABLE II.

EXTRACTS OF VARIOUS STRENGTHS MANUFACTURED FROM OIL NO. 1-A.

Per cent of oil used.	Actual reading of separated oil in duplicate determinations.		Per cent of oil after addition of correction factor.	
3%	2.7 units	2.7 units	3.1%	3.1%
4%	3.6 units	3.7 units	4.0%	4.1%
5%-A	4.5 units	4.6 units	4.9%	5.0%
5%-B	4.6 units	4.5 units	5.0%	4.9%
6%	5.7 units	5.6 units	6.1%	6.0%
8%	7.7 units	7.6 units	8.1%	8.0%
10%	9.8 units	9.8 units	10.2%	10.2%

The column of oil in the above assays was measured as under (*a*) above, *i. e.*, the height of the entire column was measured. When measured as under (*b*) consistently low results were obtained. Attention is also called to the necessity of using the average of two or more determinations in expressing results.

Following is the method recommended for the assay of lemon extracts by precipitation. The method is that of the A. O. A. C. (1924) with the suggested additions italicized to distinguish from the original method.

Pipette 20 cc. of the extract into a Babcock milk bottle; add 1 cc. of dilute hydrochloric acid (1–1), then 25–28 cc. of water previously warmed to 60° C.; mix; let stand in water at 60° C. for 5 minutes; centrifugalize for 5 minutes; *stand in water at 60° C. for 3 minutes and* fill with warm water to bring the *column of* oil into the graduated neck of the *bottle;* again centrifugalize for 2 minutes; place the *bottle* in water at 60° C. for a few minutes; *read the per cent of oil directly from the total length of the column of separated oil.* If the oil is present in amounts over 2%, add 0.4% to the percentage of oil noted to correct for the solubility of the oil. If less than 2% and more than 1% is present, add 0.3% for this correction.

Results obtained by following out the above instructions are reasonably accurate. It was noted that the results were the same whether the entire length of the separated oil column was used with the factor 0.4% or the actual volume of oil was considered and the correction factor 0.5% used. The former method has been recommended to avoid changing the correction factor, a figure familiar to all who have used this method any great number of times.

The Polarimetric Method is dependent upon the degree of rotation of the plane of polarized light by the oil in the extract. The A. O. A. C. method follows:

Without diluting polarize the extract at 20° C. in a 200-mm. tube. Divide the reading in degrees Ventzke by 3.2; in the absence of other optically active substances (sugar), the result will be the percentage of oil by volume.

Alcohol is optically inactive, so theoretically the rotation of an extract should be proportional to the amount of oil present. The rotation of an alcoholic solution of lemon oil is actually about 92% of that calculated from the rotation of the oil. In other words, lemon oil loses about 8% in rotating power in a five per cent alcoholic solution. That this loss is fairly constant has been demonstrated by other investigators and is indicated by the table given later in this paper.

To obtain a factor that would express the relation of rotation of an extract to the per cent of oil present, and at the same time correct for the 8% loss in rotation, a number of 5% extracts of representative oils were made up and their average rotation divided by 5. The factor thus obtained and adopted by the A. O. A. C. was 3.2 for the reading in Ventzke degrees or 66.6 for the reading in angular minutes. In case the extract is polarized in a Ventzke instrument, the reading divided by 3.2 expresses the per cent of oil; in an instrument reading in angular degrees, the reading of the extract in minutes divided by 66.6 expresses the per cent of oil. Investigators in the past have differed as to the correct factor for this work.

Three phases of this method were investigated by the writer as follows: (*a*) The accuracy of the method itself and the factor 3.2, (*b*) the effect of temperature upon the rotation of the extract and resultant calculated per cent of oil, and (*c*) the effect of aging.

The five per cent extracts under work upon the Precipitation Method with additional five per cent extracts, were used for this work. The results are tabulated below:

TABLE III.

A. Oil.	B. Extract.	C. Rotation of oil in 100-mm. tube at 20° C.	D. Calculated rotation of extract.	E. Rotation of extract in 100-mm. tube at 20° C.	F. Loss in Rotation from that calculated.	G. Per cent of Oil calculated, using factor 66.6.
No. 1	A	59.75°	5.97°	5.53°	7.3%	4.98%
No. 1	B	59.75°	5.97°	5.50°	7.8%	4.95%
No. 1	C	59.75°	5.97°	5.50°	7.8%	4.95%
No. 1	D	59.75°	5.97°	5.50°	7.8%	4.95%
No. 2	A	59.50°	5.95°	5.48°	7.9%	4.93%
No. 2	C	59.50°	5.95°	5.43°	8.7%	4.89%
No. 2	D	59.50°	5.95°	5.44°	8.5%	4.90%
No. 4	A	60.07°	6.00°	5.51°	8.1%	4.96%
No. 4	C	60.07°	6.00°	5.53°	7.8%	4.97%
No. 4	D	60.07°	6.00°	5.56°	7.4%	5.00%
No. 6	A	59.54°	5.95°	5.46°	8.3%	4.92%
No. 6	C	59.54°	5.95°	5.51°	7.4%	4.95%
No. 6	D	59.54°	5.95°	5.50°	7.5%	4.95%
No. 8	A	62.78°	6.27°	5.73°	8.6%	5.15%
No. 8	C	62.78°	6.27°	5.69°	9.2%	5.12%
No. 8	D	62.78°	6.27°	5.71°	8.9%	5.13%
No. 10	C	59.42°	5.94°	5.47°	7.9%	4.92%
No. 10	D	59.42°	5.94°	5.48°	7.7%	4.93%
No. 12	C	60.87°	6.08°	5.59°	8.0%	5.03%
No. 12	D	60.87°	6.08°	5.60°	7.9%	5.04%

A study of this table indicated that the average loss in rotation of the oil in the alcohol was about 8.5% (Column F). Also, that the factor 66.6 for angular minutes or 3.2 for Ventzke degrees gave authentic results.

One of the sources of error in this method is the varying rotation of various samples of lemon oil. The U. S. P. allows a variation of 7°, *i. e.*, the oil must have a rotation between 57° and 64°. Considering the loss in rotation of lemon oil in alcoholic solution as 8.5%, an extract manufactured from an oil with a rotation of 57° would contain 4.69% of oil, while an extract from an oil with a rotation 64° would contain 5.27% of oil when calculated according to this method. The majority of lemon oils have a rotation between 59° and 62°, which would give a variation in calculated per cent of oil in a 5% extract of 0.26%.

The effect of temperature upon the rotation of a 5% extract was studied. Apparatus capable of maintaining the temperature within 0.1° C. was used for this work.

TABLE IV.

Temperature.	Rotation of extract.	Per cent of oil calculated from rotation of extract using factor 66.6.
15° C.	5.64°	5.07%
16° C.	5.61°	5.04%
18° C.	5.54°	4.98%
20° C.	5.49°	4.95%
22° C.	5.48°	4.93%
24° C.	5.46°	4.91%
26° C.	5.44°	4.89%

Previous work upon a commercial sample of lemon extract using less efficient methods of temperature control gave the results tabulated below.

TABLE V.

Temperature.	Extract E.	Extract F.
17.0° C.	....	4.39%
17.8° C.	5.08%	....
18 ° C.	....	4.40%
20 ° C.	5.06%	4.37%
22 ° C.	5.01%	4.35%

Considering Table IV. There was a variation of 0.18% between the extract at 15° C. and at 26° C. and when the ordinary range of room temperature is considered (19–25°) the difference or variation is only 0.07%, a negligible error for ordinary purposes of analysis.

TABLE VI.

Extract.	Rotation April 6, 1927 at 30° C.	Rotation August 20, 1927 at 20° C.	Increase in rotation in 4½ months' period.	Per cent of oil calc. from rotation, April 6, 1927.	Per cent of oil calc. from rotation, August 20, 1927.	Increase in per cent over 4½ months' period.
1-C	5.50°	5.89°	7.0%	4.95%	5.30%	0.35%
1-D	5.50°	5.83°	6.0%	4.95%	5.24%	0.29%
2-C	5.43°	5.81°	7.0%	4.89%	5.22%	0.33%
2-D	5.44°	5.82°	7.0%	4.90%	5.23%	0.33%
4-C	5.53°	5.57°	0.7%	4.97%	5.01%	0.04%
4-D	5.56°	5.62°	1.0%	5.00%	5.05%	0.05%
6-C	5.51°	5.736°	3.9%	4.95%	5.15%	0.20%
6-D	5.50°	5.57°	0.2%	4.95%	5.02%	0.07%
8-C	5.69°	5.79°	1.8%	5.12%	5.21%	0.09%
8-D	5.71°	5.74°	0.5%	5.13%	5.16%	0.03%
10-C	5.47°	5.61°	2.5%	4.92%	5.04%	0.12%
10-D	5.48°	5.54°	1.1%	4.93%	4.98%	0.05%
12-C	5.59°	5.80°	3.7%	5.03%	5.22%	0.19%
12-D	5.60°	5.65°	0.9%	5.04%	5.08%	0.04%

Aging tends to increase the rotation of an extract. Work upon this phase has been only partially completed. A number of the 5% extracts indicated in Table III were allowed to stand in tightly-stoppered containers in a moderate light.

A perusal of this table indicates that there is a considerable increase in rotation in the case of some extracts and very little change in the case of others. At the same time, the results of this preliminary work indicate that the age of an extract affects analytical results to a varying degree. Error from this cause would appear to the casual observer to be beyond the control of the analyst or mathematician.

The following method is recommended for the estimation of oil in lemon extract by means of the polarimeter. The additions to the A. O. A. C. method are underlined:

Without diluting, polarize the *filtered* extract at *room temperature* (*19° C.–24° C.*) in a 200-mm. tube. Divide the readings in degrees Ventzke by 3.2 in the case of lemon extract and by 5.2 in the case of orange extract; in the absence of other optically active substances the result will be the percentage of oil by volume.

SUMMARY.

Experimental results indicate that the precipitation method for estimation of per cent of oil in lemon extracts is accurate, providing the height of the column of oil is considered instead of the actual volume.

The polarimetric method is the less accurate of the two, due to a number of factors, *i. e.*, the variation in rotation of various lemon oils and the effect of the aging of an extract upon its rotation. In the past most of the experimental work has been performed upon extracts of recent manufacture. The present A. O. A. C. method is readily adaptable for such extracts. The fact that the rotation of extracts increases upon standing introduces a source of considerable error, and after scrutinizing the results in Table VI, one wonders if, after all, it is not advisable to increase the factor 3.2 (66.6) to make the method applicable to the older extracts.

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THE ASSAY OF PHOSPHORIC ACID.*

BY F. A. MAURINA.

Most methods of determining phosphoric acid gravimetrically are troublesome and time consuming, and since much manipulation is necessary it is correspondingly inexact. Perhaps the most common gravimetric analysis of phosphoric acid is carried out by precipitation as ammonium phosphomolybdate.

Baxter (*Am. Ch. Jr.*, vol. 28, p. 298) has made a thorough study of the composition of ammonium phosphomolybdate and found the precipitate quite useful and efficient when weighed directly as a means of determining phosphoric acid. Although Baxter's method has been found to give satisfactory results in my hands, and is perhaps the shortest gravimetric method developed, it is obviously quite desirable to have a reliable method of determining phosphoric acid by titration with volumetric solutions.

Of all the volumetric methods which have been developed for this assay, perhaps three have stood out as the most reliable and each of these methods experienced a vogue at different periods. Unfortunately, neither of these methods show any marked advantage over the others and seem to have superceded each other only as a matter of course in the trend of time.

First we had Pemberton's volumetric method of solution of the ammonium phosphomolybdate in standard potassium hydroxide and titration with standard acid. This was subject to the errors due to the loss of ammonia, and to the uncertainty of the end-point with phenolphthalein in the presence of ammonium salts.

Next came the method of direct neutralization with standard potassium hydroxide, which at one time was used in the U. S. P. A weighed quantity of the acid was diluted with water and sufficient pure sodium chloride was added to saturate the solution. Methyl orange was then used as the indicator, and titration with normal potassium hydroxide begun and continued until the red color changed

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* Scientific Section, A. PH. A., St. Louis meeting, 1927.

to yellow, indicating the formation of the monobasic phosphate. Sodium chloride was used in this assay to decrease the ionization of the acid salts produced in the reaction. However, the end-point in this reaction is too uncertain, and the color change of the indicator is so gradual that the exact end-point becomes merely a matter of judgment varying with each operator.

The neutralization method for assay of phosphoric acid was discarded in the U. S. P. IX and precipitation with standard silver nitrate recommended and adopted. An excess of the silver nitrate solution is added to the neutralized phosphoric acid and the residual silver nitrate solution titrated with standard sulphocyanate. This method of assay has been retained in the U. S. P. X, and since the method which is proposed in this paper is merely a slight modification of the official assay, the U. S. P. method will be stated in full.

The procedure is as follows: An accurately weighed quantity of acid (about 0.1 Gm.) is diluted with 10 cc. of distilled water, in a 100-cc. flask. One drop of phenolphthalein T. S. is added and the solution neutralized with special potassium hydroxide solution, *i. e.*, one free from chlorides.

Fifty cc. of tenth-normal silver nitrate are now added and the mixture agitated, gradually adding zinc oxide in small portions until the liquid is neutral to litmus paper. Sufficient distilled water is added to make the liquid measure 100 cc., again thoroughly agitated, and filtered through a dry filter, collecting 50 cc. of the filtrate. To this 50 cc. of filtrate is added 2 cc. of nitric acid and 2 cc. of ferric alum T. S., and then titrated with tenth-normal potassium sulphocyanate to the production of a permanent red color.

The neutralization of phosphoric acid, using phenolphthalein as the indicator is represented by the equation,

$$H_3PO_4 + 2KOH = K_2HPO_4 + 2H_2O.$$

The reaction of silver nitrate on the dibasic phosphate may be represented by the following equation,

$$K_2HPO_4 + 3AgNO_3 = Ag_3PO_4 + 2KNO_3 + HNO_3.$$

It is also claimed by some that free phosphoric acid is formed,

$$3K_2HPO_4 + 6AgNO_3 = 2Ag_3PO_4 + 6KNO_3 + H_3PO_4.$$

Silver phosphate (Ag_3PO_4) is soluble in phosphoric and nitric acids and the zinc oxide is added in this assay to neutralize any of these acids formed in the interaction.

But even this method of analysis is not reliable, and if the value of the assay is judged by the number of results that can be duplicated the method is as unreliable as any of the previous methods which have been discarded.

The following table shows some of the results obtained in this laboratory from assays of the same sample of phosphoric acid by different operators, using the U. S. P. X method of assay.

Analyst.	(1.)	(2.)	(3.)
"A"	53.08%	51.30%	52.96%
"B"	50.00%	48.52%	49.85%
"C"	67.09%	52.76%	64.68%

A glance at the above figures shows quite a discrepancy in the results obtained, and, in the opinion of the author, the whole trouble in this method of analysis lies in the fact that zinc oxide is not the best reagent to use for neutralizing the acids liberated, as explained above. I have found that small quantities of zinc oxide do not react completely to bring the mixture to neutrality, and large quantities are objectionable since zinc oxide will then react with silver nitrate, precipitating Ag_2O,

$$2AgNO_3 + ZnO = Ag_2O + Zn(NO_3)_2.$$

Furthermore, zinc oxide being insoluble, materially changes the volume capacity of a 100-cc. flask, especially if a large quantity of the salt is used, thus introducing another source of error.

Zinc oxide obviously is changed to zinc hydroxide, in which form it reacts with the acids to neutralize them. The idea naturally occurred to use the hydroxide instead of the oxide. Samples of phosphoric acid were assayed by the U. S. P. method, introducing the above change, and it was found that absolute duplicates of results could be obtained. The zinc hydroxide used in this assay was best prepared as follows: Shake very finely powdered zinc carbonate with twice as much potassium hydroxide, in 10% solution, as is necessary theoretically for the decomposition of the carbonate; formation of crystals of zinc hydroxide begins at once and is complete after twenty to thirty minutes. The salt can then be washed free from alkali, either by decantation or on a filter. The salt is then best kept, ready for use, by making a suspension in water.

The method of procedure is similar to the U. S. P. method. After adding the silver nitrate solution add four or five drops of litmus T. S. Introduce into the flask about 1 cc. of the suspension of zinc hydroxide, drop by drop, from a pipette, shaking the flask after adding each drop until the color changes from red to blue. The procedure is then continued as directed in the U. S. P.

EXPERIMENTAL WORK.

For the purpose of this investigation a sample of U. S. P. phosphoric acid was analyzed gravimetrically by precipitation with molybdate solution and final determination as the pyrophosphate. ("Select Methods in Chemical Analysis"—W. Crookes.) The following results were obtained:

TABLE I.

	Wt. of sample.	Wt. of pyrophosphate.	H_3PO_4.
(1)	0.1514 Gm.	0.1478 Gm.	85.62%
(2)	0.1630 Gm.	0.1584 Gm.	85.57%
(3)	0.1776 Gm.	0.1728 Gm.	85.67%
(4)	0.1558 Gm.	0.1514 Gm.	85.61%

This same sample of phosphoric acid was then used throughout the remainder of the investigation.

TABLE II.

	Wt. of sample.	*N*/1 NaOH.	H_3PO_4.
(1)	1.1267 Gm.	20.1 cc.	87.47%
(2)	1.0552 Gm.	18.7 cc.	86.91%
(3)	1.0388 Gm.	18.5 cc.	87.32%

Another analysis was made by dissolving the acid in a saturated solution of sodium chloride and titrating with normal sodium hydroxide, using phenolphthalein. Results are shown in Table II.

Next the acid was assayed by titration with normal sodium hydroxide as above adding an excess of salt to the solution before titrating—Table III.

TABLE III.

	Weight of sample.	*N*/1 NaOH.	H_3PO_4.
(1)	1.0718 Gm.	19.9 cc.	91.03%
(2)	0.9991 Gm.	18.9 cc.	92.75%
(3)	1.0034 Gm.	18.85 cc.	92.22%

The acid was then assayed by the U. S. P. X method, using zinc oxide for neutralization. The weighed sample was diluted to 100 cc., and 10 cc. of the dilution taken for titration—Table IV.

TABLE IV.

	Weight of sample.	*N*/10 $AgNO_3$	*N*/10 KCNS.	H_3PO_4.
(1)	1.0263	50 cc.	14.47 cc.	67.09%
(2)	1.1692	50 cc.	15.55 cc.	52.76%
(3)	1.0440	50 cc.	14.67 cc.	64.68%

The same dilution as made above was used in the next experiment. Ten cc. of this dilution was again assayed by the U. S. P. method with the exception that neutralization with ZnO was eliminated—Table V.

TABLE V.

	Weight of sample.	*N*/10 $AgNO_3$.	*N*/10 KCNS.	H_3PO_4.
(1)	1.0263 Gm.	50 cc.	15.5 cc.	60.53%
(2)	1.1692 Gm.	50 cc.	14.07 cc.	61.12%
(3)	1.0440 Gm.	50 cc.	15.28 cc.	60.86%

Finally, the acid was assayed by the U. S. P. method, using zinc hydroxide instead of zinc oxide for neutralization, and using the same dilution that was employed in the later two experiments. Ten cc. of the dilution was again taken for titration.—Table VI.

TABLE VI.

	Wt. of sample.	*N*/10 $AgNO_3$.	*N*/10 KCNS.	H_3PO_4.
(1)	1.0263 Gm.	50 cc.	11.93 cc.	85.57%
(2)	1.1692 Gm.	50 cc.	9.7 cc.	85.62%
(3)	1.0440 Gm.	50 cc.	11.33 cc.	85.60%

CONCLUSIONS.

It can readily be seen from a comparison of Table I and Table VI that we have here a reliable method of determining phosphoric acid. It must be clear from this that the accuracy and rapidity with which phosphoric acid can be determined by this method warrants its consideration for a place among the standard analytical processes. Zinc hydroxide has been used for assaying phosphoric acid in this laboratory for more than one year, during which time a large number of samples were assayed by different operators, and invariably good results were obtained.

LABORATORY OF PARKE, DAVIS AND CO.,
DETROIT.

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All articles in these lists will be presented in abstract form in the bound volumes of the YEAR BOOK, which is issued annually. Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A. G. DuMez, University of Maryland, School of Pharmacy, N. E. Cor. Lombard and Greene Sts., Baltimore, Md.

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Comparison of Ephedra equisetina and Ephedra sinica and their seasonal content of ephedrine
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J. pharm. Belg., 10 (1928), 371

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Asahina, Y., and Ohta, T.
Synthesis of rutacarpine and evodiamine
J. Pharm. Soc. Japan, No. 554 (1928), 313

Feng, C. T.
Determination of ephedrine mixtures by the biuret reaction
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Bull. sci. pharmacol., 35 (1928), 292

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Alkaloids of Ouronparia rhyncophylla
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Observations on the isolation of certain alkaloids by means of trichloracetic acid
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Peyer, W., and Imhof, H.
Notes on pectin
Apoth. Ztg., 43 (1928), 613

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Baker, Wilson
Constitution of irigenin and iridin
Perf. & Ess. Oil Rec., 19 (1928), 177

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Constants of bay oil
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Odor and constitution among the mustard oils
Perf. & Ess. Oil Rec., 19 (1928), 171

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Analysis of American peppermint oils
Perf. & Ess. Oil Rec., 19 (1928), 183

Reilly, J., and Drumm, P. J.
Determination of carvone in dill oil
Perf. & Ess. Oil Rec., 19 (1928), 179

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Determination of the solubility of turpentine oil in alcohol
J. pharm. Belg., 10 (1926), 391

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Sclareol, the principal constituent of the absolute essence of Clary sage
Compt. rend., 186 (1928), 783; through *Chem. Abstr.*, 22 (1928), 2031

GENERAL AND PHYSICAL CHEMISTRY.

Eisenbrand, J.
Limits of error of the quantitative assays of the German Pharmacopœia 6 from the physical chemistry standpoint
Pharm. Ztg., 74 (1928), 626
Kolthoff, I. M.
Use of pinachrom as a one color indicator
J. Am. Chem. Soc., 50 (1928), 1604
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Conditions governing the extraction of a solution by an immiscible solvent
J. Soc. Chem. Ind., 47 (1928), 159T
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INORGANIC CHEMICALS.

Barber, H. H., and Kolthoff, I. M.
Specific reagent for the rapid gravimetric determination of sodium
J. Am. Chem. Soc., 50 (1928), 1625
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Detection of arsenic in the German Pharmacopœia 6
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Harris, Preston M., *et al.*
Atomic arrangement in the crystal of orthorhombic iodine
J. Am. Chem. Soc., 50 (1928), 1583
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Volumetric determination of ferrous ion by means of potassium iodate
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J. Am. Chem. Soc., 50 (1928), 1515
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Physical properties of salicylaldehyde
J. Am. Chem. Soc., 50 (1928), 1765
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Pharm. Zentralh., 69 (1928), 307
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Method for the quantitative analysis of lead in organic compounds
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Pharm. Weekbl., 65 (1928), 465
Keimatsee, S., and Sugasawa, S.
Synthesis of physostigmol ethyl ether
J. Pharm. Soc. Japan, No. 554 (1928), 348
Orndorff, W. R., and Shapiro, C. V.
Hydroquinolsulphonephthalein and some of its derivatives
J. Am. Chem. Soc., 50 (1928), 1730
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New colorimetric test for tannic acid
Pharm. J., 120 (1928), 539
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Mercury derivatives of isoquinoline
J. Pharm. Soc. Japan, No. 554 (1928), 374

CLINICAL TESTS.

Raquet, D.
Determination of chlorides in blood serum
J. pharm. chim., 7 (1928), 487
Raquet, D., and Paget, M.
Determination of total and feebly combined chlorine in gastric juice
J. pharm. et chim., 7 (1928), 489

AGENCY WANTED FOR TOILET PREPARATIONS IN ENGLAND.

Consul D. A. Wilson, Bristol, England, states that he has been approached by a representative of a group of business men who are desirous of forming a company to handle American products exclusively, including toilet preparations. They wish to be the sole agents representing American manufacturers of *well-known and highly advertised products* with full power on their part to appoint subagents, to distribute, and the like.

Interested manufacturers desiring to get in touch with this representative should address a letter to Consul Wilson to be transmitted through the medium of the Chemical Division.

A PHARMACEUTICAL STUDY OF SYRUP OF FERROUS IODIDE. (1840–1927).

BY CATY J. BRAFORD AND H. A. LANGENHAN.

(*Continued from p. 660, July* JOUR. A. PH. A., 1927.)

No. V. Summary of Assays.

Within the last twenty-five years there have been numerous reports in the literature regarding the purity rubric of Syrup of Ferrous Iodide. Samples have been reported varying from 3.1%[1] to 8.7%.[2] Hulbert[3] examined a sample that contained nearly twice as much ferrous iodide as is required by the U. S. P.

The following table offers a summary of the reports since 1906. Most of the data were obtained through the Digest of Comments on the U. S. P. and N. F.

Reporter.	No. of samples. Examined.	Rejected.	References.
H. V. Arny	8	2	Proc. Ohio Pharm. Assoc., 1909, p. 67
H. V. Arny	14	4	Proc. Ohio Pharm. Assoc., 1910, p. 70
H. V. Arny	15	6	Proc. Ohio Pharm. Assoc., 1911, p. 217
G. Bachman	6	1	Proc. Minn. Pharm. Assoc., 1920, p. 108
H. E. Barnard	56	9	Red. Ind. Bd. Health, 1906, p. 383
H. E. Barnard	2	0	Rep. Ind. Bd. Health, 1913, p. 433
L. A. Brown	14	11	Rep. No. Dak. Agr. Exp. Sta., P. II, 1906, p. 150
L. A. Brown	36	4	Proc. Ky. Pharm. Assoc., 1912, p. 51
L. A. Brown	32	7	Proc. Ky. Pharm. Assoc., 1913, p. 118
Chas. Caspari, Jr.	381	45	Rep. Food-Drug Com. Md., 1912, p. 15
Alfred Cook	2	1	Rep. So. Dak. F. & D. Com., 1912, p. 50
E. De Barr	9	4	Rep. Okla. P. H. Dept., 1912, p. 451
Fitz-Randolph	5	3	Rep. N. J. Bd. Health, 1911, p. 226
T. G. Hudson	32	20	Bull. Ga. Dept. Agri., 1910, no. 51, p. 145
M. Jongwald	26	16	Proc. No. Dak. Pharm. Assoc., 1919, p. 56
E. F. Ladd	72	15	Bull. Agri. Exp. Sta. No. Dak., Vol. 2, 1912, p. 136
Penniman	45	4	Rep. Md. Bd. Health, 1915, p. 174
P. Röder	2	0	Pharm. Post. Wien, Vol. 39, 1906, p. 296
L. E. Sayre	18	7	Proc. A. PH. A., Vol. 58, 1910, p. 1095
L. E. Sayre	8	8	Bull. Kan. Bd. Health, 1908, Vol. 4, p. 182, p. 298
E. E. Stallings	39	11	Bull. Ga. Dept. Agri., 56, 1912, p. 121
J. P. Street	29	4	Rep. Conn. Agri. Exp. Sta., 1915, p. 348
A. R. Todd	2	1	Rep. Mich. D. & F. Dept., 1913, p. 176
F. J. Wulling	3	3	N. W. Drug. Vol. 11, Sept. 1910, p. 25
F. J. Wulling	5	5	JOUR. A. PH. A., Vol. 1, 1912, p. 1126
A. Ziefle	72	22	Rep. No. Dak. Agri. Exp. Sta., 1912–14, p. 131
Anon.	30	4	Rep. Conn. D. & F. Com., 1916, p. 19
Anon.	6	4	Bull. Ga. Dept. Agri., Vol. 2, 1915, p. 27

EDITOR'S NOTE.—In addition to this tabulated matter Professor Langenhan has also submitted abstracts of the subject, covering more than 200 references of more than 40 pp. ms., which, it is hoped, will be published later.

As will be noted the number of samples rejected is comparatively large (approximately 25%). Wulling[4] expressed a doubt as to whether a 5% syrup could be

[1] Bachman, Proc. Minn. Pharm. Assoc. (1907), 41; through Dig. Com. (1907).
[2] Bachman, Proc. Minn. Pharm. Assoc. (1909), 70; through Dig. Com. (1909).
[3] Hulbert, Bull. No. Dak. Exp. Sta. F, Dept. 4, 345; through Dig. Com. (1917).
[4] Wulling, JOUR. A. PH. A., 1 (1912), 1122.

obtained by making the preparation according to the U. S. P. directions, after two samples that had been carefully prepared in his laboratory were found to be below standard.

In order to determine whether or not experimentation verifies such a supposition, six samples of Syrup of Ferrous Iodide were prepared. These samples of 200 cc. each were prepared according to the U. S. P. direction with only such variations as will be stated later. They were all stored in a cupboard that was painted inside with cream-colored paint and which was frequently opened, thus exposing the samples to a limited amount of light.

TABLE I.

Formula.	Tests.							Assay.* FeI_2, Gm. per 100 cc.				
	Fe.	I.	Acid.	Sugar.	Sp. gr.	$K_3Fe(CN)_6$	Starch +Cl.		Free I.	Description.	Date prepared.	Comment.
I	4 Gm.	12 Gm.	1 cc.	Excess in syrup	1.393	Blue ppt.	Blue color	7.63	None	Pale green	10/18/26	
II	4 Gm.	12 Gm.	None	Excess in syrup	1.394	Blue ppt.	Brown color	7.55	1 drop $N/10$ $Na_2S_2O_3$ decolorizes 5 cc.	Greenish brown syrup	10/18/26	
III	4 Gm.	12 Gm.	1 cc.	Excess not in syrup	1.388	Blue ppt.	Blue color	7.55	None	Pale green syrup	10/27/26	
IV	2.9 Gm.	12 Gm.	1 cc.	Excess in syrup	1.390	Blue ppt.	Blue color	7.30	$Na_2S_2O_3$ showed app. 10%	Brown syrup color decreasing	11/12/26	
V	3.9 Gm.	12 Gm.	1 cc.	Excess in syrup	1.357	Blue ppt.	Blue color	7.65	None	Pale green syrup	11/12/26	Less sugar dissolved
VI	2.9 Gm.	12 Gm.	1 cc.	Excess in syrup	1.374	Blue ppt.	Blue color	7.23	None	Pale green syrup	11/12/26	No heat applied

TABLE II.

(SAME PRODUCTS AS NO. 1 TESTED 5 MONTHS LATER.)

Formula.	Tests.					Assay.*			
	Fe.	I.	Acid.	Sugar.	$K_3Fe(CN)_6$.	Starch +Cl.	FeI_2, Gm. per 100 cc.	Free I.	Description.	
I	4 Gm.	12 Gm.	1 cc.	Excess in syrup	Blue ppt.	Blue color	7.25	None	Pale green	A little lighter than when prepared
II	4 Gm.	12 Gm.	None	Excess in syrup	Blue ppt.	Blue color	7.52	Trace	Brown	
III	4 Gm.	12 Gm.	1 cc.	Excess removed	Blue ppt.	Blue color	7.62	None	Pale green	
IV	2.9 Gm.	12 Gm.	1 cc.	Excess in syrup	Blue ppt.	Blue color	7.33	None	Pale green	
V	3.9 Gm.	12 Gm.	1 cc.	Excess in syrup	Blue ppt.	Blue color	7.56	None	Pale green	Slightly darker at top
VI	2.9 Gm.	12 Gm.	1 cc.	Excess in syrup	Blue	Blue	7.32	None	Pale green	Slightly darker at top

* The results given for the Gm. of FeI_2 per 100 cc. are the average results obtained from two or more assays.

Sample 1 was made according to the U. S. P. X and the excess sugar was allowed to remain in the syrup. Sample 2 was made in the same way but contained no hypophosphorous acid. Sample 3 was the U. S. P. syrup and was used as the control sample. The remaining three syrups were made with molecular quantities of iron and iodine computed from the following equation:

$$Fe + I_2 \longrightarrow FeI_2$$

Starting with sixty Gm. of iodine as specified by the U. S. P., thirteen and two-tenths Gm. of iron would be necessary to combine with it. The iron used in the experiment, when assayed, was found to be 92%, so the amount was increased by 10%, making the quantity 2.9 Gm. for 200 cc. of finished syrup. Samples 4 and

6 were made with such quantities. In Sample 5 this amount was increased by one Gm. In each case the excess sugar was not strained out.

The U. S. P. tests both quantitative and qualitative were applied to all six samples and the results are listed in Table I. After five months the same tests were again applied with the results listed in Table II. As will be noticed after comparing the two tables, there was but little change in any of the samples. The percentage strength remained about the same. Sample 4 which was somewhat brown when made had become slightly greener in color after standing. Samples 5 and 6 had a slight brown coloration at the top which disappeared when the bottle was shaken. The green color of Sample 1 seemed to be slightly less.

UNIVERSITY OF WASHINGTON,
COLLEGE OF PHARMACY,
SEATTLE.

ADVERTISING A PRESCRIPTION DEPARTMENT.*

BY JACOB DINER.

The author stated that he had prepared no paper but would present his subject without notes. He prefaced his remarks by saying that advertising a prescription department was not so very different from the advertising of any other department.

"Before advertising is started," he said, "it is necessary to have the merchandise which it is desired to advertise; that means before a prescription practice can be built up the store must have a prescription department and such a development can be put in at a less cost than a soda fountain. Among the things that help to build up a prescription department aside from the stock fixtures, etc., is the personality of the one who conducts the department. A pharmacist must have personality, must know prescriptions, and must have the necessary books of reference. He must have the confidence of his customers and of the physicians. The advertising of a prescription department begins primarily with the physician. He should be invited to the store, personally or by letter, and be informed relative to the qualifications of the pharmacist and of the service which the department can give. He should be informed relative to the stock and that it is the intention to carry a full line of items necessary for a complete prescription department, and that every care is exercised in order to insure safety to the patient."

He stated that physicians should be shown the manufacturing of the prescription department, how emulsions, tablets, wafers, etc., are prepared.

In his own store Dr. Diner gives information to the physicians relative to new preparations and how preparations could be dispensed to better advantage by new processes. He continued by saying that the physician might be detailed with preparations that the physician prescribes and he advised that the physician be given the formula so that he could write his prescriptions accordingly. He found it advantageous to send out letters to physicians relative to the subjects of interest and it is of particular value to have the physician advised of the official preparations, both of the U. S. P. and the N. F. In his opinion such conferences and communications as referred to, with the physicians, strengthen the confidence of pharmacists and physicians in one another.

* Remarks before Section on Commercial Interests, A. PH. A., St. Louis meeting, 1927.

In his opinion it was held important to have everything that pertains to the prescription department of the highest quality and compounded in such a way that the package itself speaks for the care that is exercised in the prescription department. "It is a good idea," he stated, "to give the physician a little more service than we think he will need." Experience had taught him that his laboratory had been productive of good results not only through direct income but also by instilling confidence in the ability of those connected with the store.

In his opinion when a patient moves away from the neighborhood and a pharmacist of the section to which the patient removes calls up for a prescription it is courtesy to give the prescription, provided the physician consents.

He referred to the work which had been done in his district in making U. S. P. and N. F. preparations better known to physicians. In this work the pharmacists coöperated and the results were very satisfactory and established a closer contact of pharmacists with physicians.

THE DIAMOND OPPORTUNITY FOR PHARMACISTS.*

BY ROBERT J. RUTH,[1] P.D., PH.M.

Henry Ward Beecher wrote, "We should so live and labor in our time that what came to us as seed may go to the next generation as blossom, and that what came to us as blossom may go to them as fruit. This is what we mean by progress."

For seventy-five years the AMERICAN PHARMACEUTICAL ASSOCIATION has functioned in a manner which might be said to be in emulation of Beecher's formula for progress:

"To improve and regulate the drug market by preventing the importation of inferior, adulterated or deteriorated drugs and by detecting and exposing home adulterations; to encourage such proper relations among Pharmacists, Druggists, Physicians and the people at large, as may promote the public welfare, and tend to mutual strength and advantage; to improve the science and art of Pharmacy by diffusing scientific knowledge among Pharmacists and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, encouraging home production and manufacture in the several departments of the drug business; to regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines; to suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Pharmacists and Druggists; to uphold standards of authority in the Education, Theory and Practice of Pharmacy; to create and maintain a standard of professional honesty equal to the amount of our professional knowledge with a view to the highest good and greatest protection to the public."

"To expedite and render more efficient the work of the Association," the various sections are provided. The Section on Practical Pharmacy and Dispensing has always been one of the most important of the five sections, and of all of them it is perhaps the most closely related to the actual practice of pharmacy. Its sessions have been largely attended by retail pharmacists who are especially interested in the professional practice of pharmacy, by hospital pharmacists who devote their time almost solely to professional practice and by members of the faculties of colleges of pharmacy. The programs of this Section have always

* Section on Practical Pharmacy and Dispensing, A. PH. A., St. Louis meeting, 1927.

[1] 80 Beekman Street, New York, N. Y.

been well planned, interesting and instructive and it may be truthfully said of this Section that it has justified its existence and contributed to the progress of the profession of pharmacy.

At the Seventy-Second Annual Meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION held in Buffalo in 1924, I had the honor to be Chairman of this Section. In my Chairman's address, I enumerated the existing evils which confronted the practice of pharmacy and then offered a list of suggested remedies. Among the remedies, I placed particular value on the widespread dissemination of public information, and as one medium for accomplishing this, I suggested the annual observance of a National Pharmacy Week.

Three years have elapsed since the Buffalo meeting—we have had two annual observances of National Pharmacy Week, adopted by and participated in by the AMERICAN PHARMACEUTICAL ASSOCIATION, the National Association of Retail Druggists, the State, district and local pharmaceutical associations, the National Wholesale Druggists' Association, the manufacturers, pharmaceutical journals and colleges of pharmacy.

Unless challenged to do so, I shall not dwell at this time upon the unqualified success of the first two observances of Pharmacy Week, nor the elaborate plans adopted for the third annual observance which will occur the week of October 9th to 15th of this year.[1] I have prepared a lengthy Chairman's report covering this subject expressly for this meeting of the ASSOCIATION and which I hope you will find of interest.

The point which I wish to bring to your attention to-day is that National Pharmacy Week had its inception at a meeting of this Section three years ago; that a resolution was adopted by this Section recommending it to the ASSOCIATION; that the AMERICAN PHARMACEUTICAL ASSOCIATION, upon the recommendation of this Section, adopted National Pharmacy Week, and then the whole of American pharmacy adopted National Pharmacy Week. National Pharmacy Week is your child and is the most powerful movement ever employed by American pharmacy as a medium for carrying the message of professional pharmaceutical service to the public. This Section is the one Section most directly interested in professional pharmaceutical service and, therefore, this Section should take an exceptionally active interest in the affairs of the National Pharmacy Week movement.

National Pharmacy Week is the Diamond Opportunity for Pharmacists, coming as it does at a most crucial period in the evolution of pharmaceutical practice, and it offers to this Section a Diamond Opportunity to add to its worthy endeavors an especial consideration for Pharmacy Week, that "What came to us as seed may go to the next generation as blossom." I have confidence that what then goes to the pharmacists of the next generation as blossom will be carefully protected and nurtured and developed by them and that they will pass it on to the following generation as fruit. Taking advantage of opportunity constitutes progress.

It is fitting that we should at this Diamond Anniversary of the AMERICAN PHARMACEUTICAL ASSOCIATION resolve to take advantage of the Diamond Opportunity for Pharmacists, and that every member of the ASSOCIATION pledge himself to

[1] Pharmacy Week proved to be a growing success and observed as far away as Australia last year.

participate to the fullest extent in the Pharmacy Week movement which is so ably depicting the part which the pharmacist plays in the conservation and protection of the health of the nation.

THE BUILDING OF A DRUG BUSINESS—WHAT THE DRUGGIST OWES THE DOCTOR.*

BY DENNY BRANN.

Chairman Keene has been in my store many times, and, invariably, our conversations turned to the subject of how to conduct a retail drug store, and how to get the most out of it. After one of these visits, Mr. Keene invited me to talk to the Section on Commercial Interests of this ASSOCIATION, on "How I Developed My Business."

Primarily, all of us are in the business for what we can make out of it, some seek fame, others glory, but in the end all of us expect a return of some kind. The best way to get returns from a drug store is to put something into it. This must be service of some kind, including service to the physician. It is up to pharmacists to serve professional men, accurately, speedily, neatly and wisely, with the welfare of all concerned in mind and view.

I was asked to tell you how I built my business, and this is rather difficult except in the words of Topsy—"It just grew." Topsy had to be fed and nourished or she would not have lived, so it is with my business, or it would not have survived. A retail drug business must be fed by the application of thought, time, energy, kindness and willingness. None of these factors can be bought or sold, but they must be given, and such attention the druggist owes the physician. If the druggist is thoughtful of his business, he will give due consideration to the physician. He should know his merchandise, and stock the best that money can buy. Too many of our stores are becoming merchandising institutions, and buy with price in view rather than quality or label. I have known manufacturers to put out preparations which do not conform to the U. S. P. or N. F., but should have, and expect druggists to buy them because of the lower price. This must be guarded against. If I add my word to the advertisement of a product that is placed on the market by a reputable manufacturer, the physician is generally willing to give it a trial.

Kindness, willingness and enthusiasm are all expressions of thought. All transactions should be cheerfully conducted and the doctor's orders should be carried out with strict compliance.

The clerk should be qualified to give information as to price, dosage and appearance of the medicines dispensed, and the doctor should be given all the information needed by him in prescribing. It is through these acts and courteous attention that drug stores grow into profitable businesses.

The same thought applies to all divisions of the drug business—time, energy, kindness and willingness. Time to a druggist is a plus item; he must serve while others work, play and rest. Not so long ago a druggist drove eighty miles after midnight to deliver antitoxin, which might have been sent by train, but he was

* Parts of an address before Section on Commercial Interests, A. PH. A., St. Louis meeting, 1927.

afraid of possible delay. This service was very greatly appreciated. The promptness with which medicine is delivered is a big factor in maintaining professional trade. It makes no difference whether the order is for ether, bandages, ampuls or toilet articles—our aim is to deliver as promptly as possible; and with the same promptness a 'phone call is answered. The clerk answering the 'phone can only surmise the importance of the message and must take it for granted that prompt attention is necessary; any other action may prove hurtful to the business, the patient and the doctor.

Energy is quite as important as the saving of time in service, particularly in the way merchandise is delivered. It takes very little time to wrap a package and put a proper label on it, whether one point of vaccine or five pounds of cotton is being sent out; they must be wrapped, for you never know in the delivery of a package who is going to see it. Most patients prefer that medicines and the like are not exposed to the neighbors' view, and such care as indicated is appreciated by doctor and patient. The container for medicines should be carefully selected and the label should be type-written—care and neatness are good advertisements.

In stocking my shelves, I endeavor to select preparations made by nationally known and reputable manufacturers, and I do not change unnecessarily, so that there will not be a difference in appearance to the doctor or the patient; when the doctor calls for such item, he will visualize that preparation before it reaches his desk, and when he is ready to use it he will do so, satisfied that it is just what he had in mind. This is one of the ways in which I have gained the confidence of physicians.

Manufacturers should more fully realize the importance of the retailer—he contacts with the public. He must have the information, carry the stock and render professional service and this the manufacturer does not fully appreciate. In most stores the profits on candy, cigars and toilet goods are much larger than on medicines; the reverse should be true and proper attention to the professional side will develop volume and profit and give the pharmacist a better standing in the community.

A Maine (Carrabasset) Trout Pool—and there are some fishermen among A. PH. A. members.

DEPARTMENT OF BUSINESS MANAGEMENT

Conducted by Paul C. Olsen.*

COMMENTS, QUESTIONS AND SUGGESTIONS ARE INVITED AND WELCOME.

Readers are invited to submit comments, criticisms and suggestions regarding the material which appears in this department. The Editor also will undertake to answer questions regarding general problems of business management. Letters of general interest will be published, but the writer's name will not be revealed without his permission.

HOLIDAYS—TOO COMMERCIAL?

Nowadays, in place of the most holy of thoughts, the first thing that many people associate with Christmas is some most unholy thought of bills—bills of prodigious amount which knock gally-west until late in the following spring any carefully calculated budget.

Then there is Mother's Day; truly a most noble sentiment for a holiday. But, say the skeptics, Mother's Day, started as an excuse for florists to sell a few carnations for high prices, has become now a veritable golden harvest for those merchants in an otherwise dull season. Hungry-eyed vendors of other merchandise—candy, jewelry, pianos or what-have-you—have tried, with no inconsiderable success, to give the Midas touch of Mother's Day sentiment to their goods.

Cynics attribute the origin of Father's Day to jealous cigar manufacturers who could think of no possible way to associate their products with Mother's Day.

Thanksgiving is a day of thanksgiving, but principally for the restaurants, theatres, and college athletic associations, not to mention a few lines of business which have not had legal sanction since the Volstead Act.

Rumor has it that the ever-busy greeting card manufacturers, faced with a dull summer season, are busy concocting a holiday to break the long stretch from the Fourth of July to Labor Day. In fact, Saturday afternoon, until recently unassailable as the premier week day recreation-time, seems in danger of losing its supremacy to holidays, old and new, which are being studied on the calendar with the regularity of pay days and installment collectors' visits.

But of course this increasing number of holidays and the increasing attention given to existing holidays is not a magnanimous gesture on the part of people with a flair for sociology and philanthropy. They waste no time in pointing out that the main purpose of all holidays is to produce additional business for undeserving plutocrats.

Perspiring, discontented 22-year-old John Fitzwater surveys the world from the eminence of his high stool in the accounting department of the Premier Amalgamated Coal Company. John looks with envy upon the prosperity of his father's neighbor, a manufacturing confectioner who has been lifted to the luxury of two

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Cadillacs seemingly upon the rising tide of Valentine's Day, Easter, Mother's Day, out of town week-ends, and a half-dozen other more or less worthy celebrations which seem to occasion liberal purchases of expensive candies.

To John, it does seem as if this confectioner has prospered undeservedly by an unholy capitalization of human sentiment. To make matters worse, these despoilers of hallowed holidays are not content to loot the holidays that already exist, he observes. Nefarious propagandists, they create new holidays in order that they may have excuse for additional ravages upon the pocketbooks of long-suffering consumers.

But let's turn a minute to these accused commercializers of human sentiments. What have they to say—what can they say—in defense of their practices?

"Sure, we do all we can to popularize Mother's Day," says the genial and somewhat stout confectioner against whom John Fitzwater felt a personal envy.

"That and every holiday which can be tied up in any way to promote the sale of our candy we boost in every manner we can. That sounds selfish, doesn't it, and it is selfish, but it's just what you would do if you were in our position.

"What is more, we believe that in spite of our admittedly selfish purpose in promoting an interest in these holidays the general public good that our efforts accomplish far overbalances any of these negative effects about which these critics complain so loudly. I'll tell you why.

"First of all, let's try to dispose of this question of our selfishness. We are in business to make a profit and can't stay long in business unless we do make a profit. Therefore any efforts we make to promote an interest in holidays must return us a profit directly or indirectly if we are to continue them. What I say is that there is also a public profit as a result of our admittedly selfish efforts which outweighs any personal gains which our activities may bring us.

"Take Mother's Day, for instance. How many millions of mothers' hearts have been gladdened on the second Sunday in May by the receipt of candy, flowers or some other token of love and affection? Of course the confectioners, the florists and other merchants have profited, but what is their profit as compared with the joy and appreciation in the hearts of these millions of mothers, which come as a result of these Mother's Day gifts in the form of candy, flowers and other things?

"Ask the telegraph companies what Mother's Day has meant to them. These fish-blooded critics of holidays, who probably haven't an ounce of sentiment in their whole make-up, will think immediately in terms of how many more messages Mother's Day has brought the telegraph companies. But what do those messages say? To whom do they go? Think of the joy and cheer they have brought to mothers all over this broad land of ours from sons and daughters scattered in the four corners of the earth.

"Somebody will tell you that all these messages, all these flowers, candy and other gifts could be sent without any Mother's Day. It would be just as well to argue that a business can grow to its maximum without advertising. Mother's Day propaganda has aroused and created a hundred times more sentiment in one year than ever would have existed in ten years without it. It is only stating the facts to say that in maternal regard, as in everything else, we need somebody always at our shoulder to keep us reminded of what to do and when to do it.

"I suppose there are some people sour enough and crabbed enough to object to band concerts in the public parks in the summer time because they put a little money in the pockets of union musicians, band instrument makers and the tailors who make the musicians' uniforms.

"Go a step further. Why not do away with preventative medicines because some manufacturers are bound to profit from their use?

"It is true that the manufacturers of toy railroad trains, Fourth of July flags, and Mother's Day candy do make a profit, but the joy these goods bring to the hearts of both givers and recipients is far, far beyond whatever money profits the producers and distributors of these goods may have made!"

Perhaps the critics are looking at this matter of holiday observance with a myopic eye? Don't we really owe a debt of gratitude to these holiday propagandists who must know only too well that they can't promote their own selfish interests successfully without bringing far greater rewards to those whom they serve—the great body of the people!

THE PHARMACIST AND THE LAW

BY HOWARD KIRK,* EDITOR OF THIS DEPARTMENT.

We have been asked to write about the difference between trade marks and trade names. This is not so easy to do. Let us start out by saying that the law of the trade mark is a development of the old English doctrine of "market overt"—open market. If a tradesman brought his wares to the open market and displayed them on the weekly market day, he was entitled to mark those wares with a symbol or sign which would show to the public whose wares they were or who manufactured them. This marking was known as a trade mark. It was required to be affixed directly on the mechandise either by stamping, painting or by label.

The tradesman was protected in the enjoyment of this trade mark. No other person was allowed to copy it so long as the mark was in use in buying and selling on the open market. If, however, the original tradesman went out of business or ceased to use the trade mark, then anyone else was allowed to make use of it.

The law of trade mark, therefore, rests on the old common law of England. Statutes have been passed by Congress and by a number of the states which permit the registration of such trade marks, but these statutes merely provide for the keeping of a public record and did not give any longer life or greater validity to the trade mark than was provided by the old common law.

The trade name, however, is somewhat different. It is the name by which a man in business seeks to become known and is known. The name itself does not have to be affixed to any particular article of merchandise. Again, as in the case

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of a trade mark, the right to the use of a trade name, and the protection against infringement, rest on the common law.

It follows naturally that there must be a restriction on the kind of names which may be employed either for trade marks or trade names. If, for instance, an apple-grower should seek to pre-empt the trade name "Good Cider Apples" the law would not protect him; any other farmer could call his apples "good cider apples" too. Neither could one say "Delaware County Apples" and thereby prevent any other apple grower in Delaware County from using the same form of words. If, however, he coins the "Smithkist" or "Joneskist" he will be protected, for no other Smith or Jones may use the same appellation.

Sometimes it is quite difficult for the Court to decide whether an adopted trade mark or trade name is entitled to protection. As the Supreme Court said in a case which occurred several years ago:

> "It (the trade mark) may consist in any symbol or in any form of words, but as its office is to point out distinctively the origin or ownership of the articles to which it is affixed, it follows that no sign or form of words can be appropriated as a valid trade mark, which from the nature of the fact conveyed by its primary meaning, others may employ with equal truth, and with equal right, for the same purpose."

In order to grasp the decision of the Supreme Court some careful thinking is required. There is such a thing as a secondary meaning to a term employed as a trade mark or trade name.

Suppose I should invent a new medicinal preparation and call it "Nervalene." I would have absolute right to use that name to describe my product; and if I should choose to sign myself "Nervalene Proprietor, Philadelphia," I would be protected in the use of this expression as a trade name. But suppose, further, that Nervalene became so well known, that finally it became part of the commonly accepted speech of the people; in such event I would lose the right to the exclusive employment of the term. Since the preparation was not patented, anyone else would have the right to make it; and since "it" was Nervalene, they could call it by that name.

In other words the Courts have decided that the control of the name of a thing is the control of the thing itself. A very interesting case in point was that of the Singer Sewing Machine decided by the Supreme Court of the United States a number of years ago. At the expiration of the patent upon the Singer Machine certain competitors sought to make similar machines and call their product by the name "Singer." The Singer Company promptly applied for an injunction asking that such competitors be prevented from using the name "Singer." The Supreme Court decided that inasmuch as the patent on the Singer Machine had expired the name "Singer" passed to the public and anyone that was able to make a Singer Sewing Machine could use that name in designating it. The Court said that this sewing machine was so well known that the word "Singer" meant to the public a sewing machine of a certain type. Therefore all competitors were permitted to use the name "Singer" although they were prohibited from using any method to mislead the public into believing their products were those of the original manufacturers of the Singer Sewing Machine. The name had passed to the public and the Singer Company had to pay the penalty for the machine's popularity.

THE DEPARTMENT OF THE NATIONAL ASSOCIATION OF BOARDS OF PHARMACY

A. C. Taylor, President, Washington, D. C. J. W. Gayle, Treasurer, Frankfort, Ky. Lucius L. Walton, Chairman of Executive Committee, Williamsport, Pa. H. C. Christensen, Secretary, 130 N. Wells St., Chicago, Ill.

ACTIVE MEMBER STATES.

Alabama	Indiana	Montana	Rhode Island
Alaska	Iowa	Nebraska	South Carolina
Arizona	Kansas	Nevada	South Dakota
Arkansas	Kentucky	New Hampshire	Tennessee
Colorado	Louisiana	New Jersey	Texas
Connecticut	Maine	New Mexico	Utah
Delaware	Maryland	North Carolina	Vermont
D. of Columbia	Massachusetts	North Dakota	Virginia
Florida	Michigan	Ohio	Washington
Georgia	Minnesota	Oklahoma	West Virginia
Idaho	Mississippi	Oregon	Wisconsin
Illinois	Missouri	Pennsylvania	Wyoming

A MESSAGE FROM THE PRESIDENT.

Dear Board Member:

It will be but a short time before we meet for our annual convention in Portland, Maine. I trust that you are arranging matters so that you will be able to attend. This is our 25th annual convention, our *Silver Anniversary*, and we should make it our largest and most successful.

This year completes a quarter of a century of labor and during this time we have seen our Association win its way to a position of great importance among that interdependent group of organizations that are striving to protect and improve the standing of our profession.

No one can look back upon the path we have travelled without being convinced of the soundness of the policy that the N. A. B. P. has followed. We have proved our ability to work together for the things that benefit Pharmacy. We have been successful, but we must not let success slow up our efforts. There are many problems yet to be solved and the solutions will be found through intelligent and intensive coöperation.

There is more wisdom among many than among a few. Make every effort to be present that we may have the wisdom and judgment of many. Remember the dates, August 20th and 21st.

Maine is unique in her appeal to the vacation seeker and offers many opportunities for rest and recreation. Maine is prepared and waiting for the coming guests, her highways are ready and her people eager. And you will find not only the things that minister to health and comfort, but also vast treasures of history and tradition.

A vacation spent in Maine will be an investment in health and happiness.

Fraternally yours,

AUGUSTUS C. TAYLOR, *President.*

STATE BOARD NEWS.

(CULLED FROM MANY SOURCES.)

Alabama.—The Alabama Pharmaceutical convention held aboard a steamship on the Atlantic Ocean was a great success. W. E. Bingham, Secretary of the Board and the Association, stopped off at Washington, D. C., and called on President Taylor of the N. A. B. P.

Arizona.—Fred W. Ritter, President of the Arizona Board of Pharmacy, with his family recently attended the commencement exercises of the University of Southern California in Los Angeles at which his daughter Miss Flora Ritter was graduated.

Mr. and Mrs. Arthur G. Hulett drove to San Diego, California, to attend the annual convention of the California Pharmaceutical Association, June 27th to 29th, and then went on to Los Angeles, where Mrs. Hulett is remaining for the summer to do advanced studying in voice and piano. Mr. Hulett enjoyed a pleasant visit with Secretary Kelly of the AMERICAN PHARMACEUTICAL ASSOCIATION while at the California convention.

The next regular meeting of the Arizona Board will be held in November.

Arkansas.—Edwin Bradley, of Hot Springs, was recently appointed a member of the Board of Pharmacy to succeed George J. Terry of Batesville.

The present officers and members of the Arkansas Board are as follows: *President*, Booker Latimer of Dewitt; *Vice-President*, Herman H. Horst of Stuttgart; *Secretary*, Herbert Parker of Jonesboro; L. H. King of Little Rock, and Edwin Bradley of Hot Springs.

Colorado.—The Board of Pharmacy reports rushing business in the number of apprentice registrations, reciprocal applicants, and examination candidates, as Inspector I. E. Kemble has been checking up closely on the laggarts.

Ernest J. Howard of Denver recently resigned his membership on the Board of Pharmacy. His successor has not been appointed by the governor.

The term of Charles J. Clayton, Secretary of the Board, expired in June 1927, but he has been serving on the Board as a hold-over until his successor is appointed. It is, therefore, quite possible that the governor may appoint two members to the Board in the near future. The state association has submitted the following list of nominees: Karl M. Frey, Pueblo; Harold A. Parkinson, Glenwood Springs; Julius F. Earnest, Denver; J. E. Stauffer, Rifle; Charles J. Clayton, Denver.

The next examination will be held at the Capitol, Denver, September 21st and 22nd.

District of Columbia.—Louis F. Bradley of Washington has been re-appointed as a member of the D. C. Board of Pharmacy for another term of five years.

All of the Board are members of the D. C. Drug Veterans and recently attended a joint luncheon with the Baltimore Veterans held at Annapolis, Maryland.

A. C. Taylor, President of the N. A. B. P. and also of the D. C. Board, was one of the principal speakers at the convention of the Virginia Pharmaceutical Association held in Roanoke, Va., on June 26th to 28th. He told of his experiences as an independent pharmacist in combating chain store competition.

President Taylor made a trip north to attend the graduation exercises of Boston Tech. in June, from which his son was graduated. While in Boston, he looked up members of the Massachusetts Board and presented greetings from the N. A. B. P. The only unhappy incident on the whole trip was that he contracted a very painful and inconvenient infection in one eye.

Idaho.—A pharmacy examination was held in Boise on July 17th and 18th but the results are not as yet available. The members of the Board present were: Don S. Whitehead, of Boise; E. E. Waite, of Parma; and Richard F. Curtis, of Sandpoint.

Kansas.—The Kansas Board of Pharmacy examined eighty-five candidates at its June examination. Of this number, forty-seven were for full registration and thirty-eight for assistant registration.

Two new members officiated at this meeting—Percy Walker, of Topeka, Kansas and Mac Childs of Eldorado, who were appointed to fill the places of the two retiring members, John Schmitter and N. G. Edelblute.

The following officers were elected: *President*, Joe Demain, of Macksville; *Treasurer*, Percy Walker, of Topeka; *Secretary*, A. H. King, of Manhattan.

The Board of Pharmacy, including the retiring members, entertained at dinner at the Lawrence Country Club with the following guests present: Dean L. D. Havenhill and Professors D. H. Spencer and C. M. Sterling of the University of Kansas School of Pharmacy, and President Walter Varnum and Secretary Roy Reece of the state association. The principal subject of the evening was a discussion of ways and means to get a college prerequisite for Kansas.

A Topeka grocer was recently sentenced to ten days in the county jail for violating a law passed in 1913 which requires a license fee of $2.50 from general stores, grocers and others not pharmacists, for permit to sell domestic remedies or medicines in unbroken packages. The grocer had been selling aspirin without such a license and pleaded guilty.

The defense attorneys announced a habeas corpus action would be brought in the Supreme Court to get the grocer out of jail, although, of course, he isn't in. This will put the validity of the law squarely before the Supreme Court.

Maryland.—Lloyd N. Richardson of Belair, has been re-appointed as a member of the Maryland Board of Pharmacy for another five-year term.

An examination was held at the school of pharmacy of the University of Maryland on Tuesday, Wednesday and Thursday, May 29th, 30th and 31st. There were fifty-eight applicants for full registration and eighty-three for assistant licenses. The work was so arranged that the various examinations were conducted at the same time, the laboratory exercises being given one group while the written work was being done by the other. Results were not available at the time of going to press but will be published next month.

George A. Bunting, member of the Maryland Board, motored to Staunton, Va., on June 4th with Mrs. Bunting and daughter Miss Dorothy, to attend the commencement exercises of the Staunton Military Academy where his son, Lloyd Bunting, has been attending school.

Minnesota.—A new interpretation of "temporary absence" has been handed down by the Minnesota Supreme Court. The law of that state requires a drug store to be in charge of a registered pharmacist at all times, or during his temporary absence, in charge of an assistant pharmacist. In reversing the decision of a lower court which held the sale of essence of peppermint during the absence of the registered proprietor a violation, the Supreme Court stated as follows:

"A registered pharmacist owner is at all times in charge while during the short intervals of the day he is at his meals within easy reach and on call, and the one left in charge of the store does not undertake to sell any drug during his absence."

The court also held that essence of peppermint is not a drug, being used as a flavoring extract and for baking. This decision makes possible the "one man" store and puts a new interpretation on "temporary absence."

Montana.—Secretary J. A. Riedel announces his new address as 208 Ave. D., Billings, Mont.

The convention of the Montana State Pharmaceutical Association will be held July 9th and 10th, and its legislative committee is framing a new pharmacy law to include ownership, peddler and revocation clauses. No change in standards will be made as Montana now has the prevailing college prerequisite.

The membership of the Board is as follows: *President*, John W. Seiden; *Vice-President*, Charles J. Chapple; *Treasurer*, Alex F. Peterson; *Secretary*, J. A. Riedel.

Nebraska.—The Nebraska State Board examination in Pharmacy was held June 18th to 21st inclusive at the Creighton College of Pharmacy, Omaha, with 120 candidates present. The examination was conducted by Messrs. Guy Butler, W. B. Walter and Fred J. Creutz, board members assisted by Mrs. Clark Perkins, Director of the Bureau of Examining Boards and Miss Helen Freeman, clerk from the Bureau.

Daniel J. Fink, an honorary N. A. B. P. member (formerly of Nebraska Board of Pharmacy) attended his forty-first consecutive meeting of the Nebraska State Pharmaceutical Association recently. This is undoubtedly the record in loyalty.

New Jersey.—Dr. Robert P. Fischelis blames a lack of proper training in practical work for the failure of so many candidates in a recent licensing examination given in New Jersey in which only nine out of eighty applicants for full registration and six out of thirty-one for assistant registration passed. Dr. Fischelis points out that apprenticeship in a modern pharmacy does not offer the candidate much pharmaceutical training and the schools have failed to give sufficient

practical work to bridge the gap. Theoretical work alone is not sufficient to prepare a man for the Board examination.

North Dakota.—At the meeting of the North Dakota Board which was held in Fargo, June 12th, 13th and 14th, sixteen were successful in passing the examination and becoming registered pharmacists. Three candidates were granted certificates as assistant pharmacists.

Those conducting the examination were H. L. Haussamen, *President;* W. P. Porterfield, Burt Finney, O. B. Sjurseth and P. H. Costello, *Secretary.*

Oklahoma.—A class of twenty-three finished the examination held in Oklahoma City on June 4th–5th, seventeen of which made passing grades.

W. C. Alston of Checotah has been appointed by Governor Johnston to succeed Perry Freeman of Washington, whose term expired recently.

The present officers of the Board are: *President,* Paul W. Moomaw; *Vice-President,* Cecil G. Steward; *Treasurer,* H. S. Shackleford; *Secretary,* C. M. Anderson.

Pennsylvania.—At the examinations held by the Pennsylvania Board of Pharmacy on June 7, 8 and 9, 1928, there were 282 candidates for "pharmacist" registration and 142 candidates for "assistant pharmacist" registration. At this writing, the Board is in session at Eagles Mere rating the papers.

South Carolina.—John H. Frierson of Charleston, South Carolina, has been elected a member of the Pharmacy Examining Board. (The South Carolina law provides that the State pharmaceutical association is to elect a member of the Board annually—appointments are not made by the Governor as in other states.)

Tennessee.—Samuel C. Davis, member of the Tennessee Board of Pharmacy and a member of the Tennessee House of Representatives in 1925 and 1927, has announced his candidacy for the State senate.

Virginia.—The Board of Pharmacy of Virginia met in Richmond on May 30th and 31st and June 1st. Examinations were conducted in the Medical College of Virginia on the first two dates, and there were twenty-three applicants for the registered pharmacist certificate, of which number eighteen were successful. There were thirty-three applicants for the registered assistant pharmacist certificate, of which number twelve were successful.

W. Kent Scott of West Virginia was granted reciprocal registration.

Dates of the fall examinations were tentatively fixed as Tuesday and Wednesday, November 13 and 14, 1928.

The Board ruling requiring at least four years' high school credit, fifteen or more acceptable units, or the equivalent, became effective for applicants for the "assistant pharmacist" examination July 1, 1928.

S. C. Brooks, Jr., arrived in Winchester, Virginia, May 12th—a new arrival in the family of S. C. Brooks, member of the Virginia Board of Pharmacy.

H. C. Littlejohn, of Leesburg, Board member and local pharmacist, conducts classes in pharmacy, materia medica and chemistry for the nurses in the local hospital, as a sort of good citizen's contribution to his community.

VISITORS.

E. F. Kelly, Secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION, honored the N. A. B. P. Secretary's office with a personal call on Monday, June 11th, while stopping over between trains in Chicago. He was on his way to the Pacific Coast and Western States to attend the meetings of several state associations.

CONTROLLING CLOTHES MOTHS.

Complete elimination of clothes moths from dwellings and other buildings is difficult, but they can be kept in control by methods outlined in *Farmers' Bulletin* 1353-F, U. S. Department of Agriculture, "Clothes Moths and Their Control," which is available for distribution on application to the department. Pharmacists can utilize these publications to their own profit, while rendering an appreciated and valuable service to the public.

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C. B. JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A. A. C. P., EDITOR OF THIS DEPARTMENT.

THE ASSOCIATION HAS A NEW SECTION.

A NEW section has been created in the American Association of Colleges of Pharmacy known as the Commercial Section. It will be in operation for the first time at the Portland meeting this August. As its name implies the Commercial Section will concern itself with those features of pharmaceutical education that have to do with the business, as distinguished from the scientific side of modern retail pharmacy. Whether the new section accomplishes what its sponsors expect depends upon (1) the energy and initiative of its recently appointed officers, and (2) the support it receives from the membership of the Association. As Chairman of the Section I speak for the officers in pledging out best efforts, and in the same capacity I plead for the help of the deans and faculty members of schools belonging to the Association.

The program of the Commercial Section, like that of the other sections, will be carried out on Monday morning, August twentieth. It will take the form of a conference, just as the sections on pharmacy, chemistry and materia medica hold conferences. The program will be devoted mainly to the character and amount of commercial instruction that should be offered in member colleges. Consideration will also be given to the texts now available and the texts which should be available for teaching commercial subjects.

Whether teachers favor or oppose the addition of business courses as required studies in Association colleges, they are urged to attend the Commercial Conference and present their views. Only by a free discussion, with all shades of opinion represented, can there issue from the Conference the sort of curriculum suggestions that need to be presented to the general membership.

Perhaps no subject in the field of teaching is more important just now than is the question of whether or not schools should reflect in their curricula the increasing ratio of commercial to professional practice in the modern American drug store. What subjects, if any, to add and the hours they are to have, and what subjects to drop to make room for the additions are matters about which all schools could well seek counsel. The Commercial Section will not supply the whole answer, but it is one agency of search and as such is entitled to widespread support and encouragement.

As Chairman of the Section I not only invite a full attendance at the first session but I earnestly entreat the teachers who will go to Portland to give the new division of the Association their sympathetic coöperation to the end that from the discussions and deliberations there may develop something of real value to pharmacy.

J. G. BEARD, *Chairman.*

THE TEACHING OF PHARMACOGNOSY.

BY ELMER H. WIRTH.*

Pharmacognosy is perhaps the least standardized course in the present American Pharmaceutical curriculum. The subject matter presented is fairly uniform in that the important U. S. P. and N. F. drugs are studied as to their identity and properties. Teaching methods, however, vary widely. Let us hope it always remains so. Teaching methods are a mark of individuality and individuality is a far greater factor in education than standardization. Kremers,[1] in discussing how the teacher of pharmacognosy should teach his subject points out—"it largely depends upon the scientific preparation and inclination of the teacher. The pharmacognosist whose preparation has been largely botanical will naturally make the most of his botany. If his preparation has been largely chemical he will make the most of his chemistry." It is not, however, the purpose of this paper to discuss factors affecting teaching methods.

Several recent numbers of the JOURNAL have carried articles relative to the teaching of pharmacognosy. These together with the Round Table on teaching methods of the annual Plant Science Seminars prove the subject to be of interest. At this Round Table many experiences are exchanged and the meetings become of vital value to those attending in the acquisition of new ideas and especially in seeing "how the other fellow does it." Such a motive prompted the writing of this paper.

With the advent of the three-year curriculum at the University of Illinois came the acquisition of a new building and the remodelling of old ones. This was accompanied by a subsequent remodelling of courses and Organic Materia Medica and Pharmacognosy were placed in the second year. First-year courses in this department are designed to be more or less preparative for, and are considered as prerequisites of the second- and third-year courses. These prerequisites are as follows:

A 4- (credit) hour course in General Botany dealing chiefly with the flowering plants and consisting of 3-lecture or recitation (clock) hours and one laboratory period of 3 (clock) hours, covering one semester.

A 3- (credit) hour course in plant histology covering microscopical and microchemical technique, a study of the plant cell, tissues and the structure of organs. This course comprises two 3- (clock) hour laboratory periods and one recitation hour per week and continues over one semester.

A one semester, 3- (credit) hour course in Physiology and Hygiene consisting of three-lecture or recitation hours weekly.

MATERIA MEDICA.

The second-year course in Materia Medica continues over both semesters and comprises two lectures and one recitation weekly. Dean Day, in his lecture work covers all of the U. S. P. and N. F. (and several unofficial) drugs of vegetable and animal origin as well as their official derivatives, considering them in regular

* Assistant Professor of Pharmacognosy, University of Illinois School of Pharmacy.

[1] JOUR. A. PH. A., 16 (1927), 72.

taxonomical order. These lectures are illustrated with specimens, charts, maps and lantern slides and the drugs are discussed as to titles, synonyms, botanical source, cultivation, collection, preparation and commerce, standardization, therapeutic properties and uses, dose and preparations. The Dean also includes many informal reminiscences concerning the history and use of the various drugs. Entirely separate from this course yet running hand in hand with it, is the course in pharmacognosy.

PHARMACOGNOSY.

Pharmacognosy is a division of Materia Medica. At Illinois we consider it to be the laboratory work accompanying the lecture work in Materia Medica, and as such confine ourselves to the following definition: "Pharmacognosy is the study of the identification, the quality and the purity of crude vegetable (and animal) drugs." This definition gives us a concrete basis to work upon. We are to study the drugs with a two-fold purpose, *first*, how they may be identified, and *second*, after being identified how one may determine if they are pure and of good quality. With these as principles upon which to base our studies we outline our course. The first laboratory periods are devoted largely to orientation, an explanation of how to study drugs, and a brief review of the bearing of the prerequisites upon the work. While this is all included in the author's manual it is nevertheless gone over carefully and illustrated with specimens. This preliminary outline creates a "point of view" for the student.

In discussing the first part of the definition, *viz.*, identification, the fundamental methods for drug recognition are taken up. The subject is first divided into two parts, macroscopical and microscopical. The recognition of whole or entire drugs can only be of value if associated with their description, and the closer the descriptive features of the drug are studied the more definite mental picture will remain. For convenience these descriptive features are divided into four groups, (1) size and shape, (2) color and external markings, (3) fracture and internal color and (4) odor and taste, and the preliminary work occupies itself in discussing the various shapes in which drugs occur as well as the various markings such as fissures, scars, lenticels, lichens, etc., found upon them. For example, underground parts such as rhizomes, roots, bulbs, corms, tubers, etc., may occur (1) entire, (2), in longitudinal slices, (3) in oblique or transverse slices or (4) in small cubical pieces. In shape they may be cylindrical, cylandraceous, conical, fusiform, ovoid, pyriform, terete, disk-shaped, etc. They may be branched and are frequently curved and twisted. Among the external markings commonly found are furrows, wrinkles, annulations, fissures, nodules, abrasions, leaf scars, leaf bases, stem bases or the scars of stem bases, roots, root scars, buds, bud scars, bud scale scars and so on. Every effort is made that the student may see these points and learn to use the proper terms in describing them. Types of fractures and fractured surfaces are discussed as also are color, odor and taste, in relation to both their organoleptic conception and their value in crude drug identification. Microscopical identification of a whole drug involves the study of cross and longitudinal sections and here the importance of the histological prerequisite is dwelt upon. It is essential that the student be able to recognize regions, tissues and cell contents, not only in the study of sections but also in the study of powdered drugs. Along with identification several types

of identity tests are considered, such as those depending upon anthraquinone derivatives, tannin, etc.

In connection with the second part of the definition, quality and purity, the factors influencing them are gone over. The quality of a drug is dependent upon its active constituents and as these have been studied previously in the course in Histology under cell contents, this connection is pointed out. Methods for the determination of active constituents, that is, the quality of the drug, are considered. The purity of a drug is dependent upon the presence or absence of foreign organic and inorganic matter and these items are considered together with methods for their determination and detection. Finally the U. S. P. and N. F. are discussed

Fig. 1.—Pharmacognosy laboratory, University of Illinois School of Pharmacy. The laboratory accommodates 72 students working at one time; each student having approximately six square feet of working space. Desks are equipped with gas, water, electricity and sink, locked drawers being provided for the keeping of apparatus. The case to the right of the door contains the microscopes and the collection to the right of that includes drugs official in foreign pharmacopœias. The collection on the left wall is described under Fig. 2.

as standards for the three divisions of the definition; identification, quality and purity. After this preliminary discussion the student has a fair idea how to go about the work in general.

THE LABORATORY.

The pharmacognosy laboratory (Figs. 1 and 2), is about 34 x 42 feet, and is equipped with three work tables each consisting of six sections. One section accommodates four students and is equipped with water, gas, electricity, reagent shelf and reagent block, sink, tripod, test-tube rack, microburner, etc. At each disk are five kit drawers. Thus the laboratory accommodates 360 students, seventy-

two at one time. Each student has about six square feet of working space. Seventy-two compound microscopes, equipped with ocular and objectives to give 100 × and 600 × magnification are part of the general equipment. These are augmented by six micropolariscopes and six binoculars. A stereoptician is also part of the equipment. The lights for microscope illumination are so placed beneath the reagent shelf as not to cast their rays upon the screen, thus microphotographs thrown upon the screen may be shown at the same time that sections are studied microscopically. One side of the laboratory is lighted by windows; one end contains blackboards and maps and the other two sides collections of crude drugs. These collections are particularly interesting. The one situated on the longer wall contains a specimen of every drug of vegetable and animal origin ever

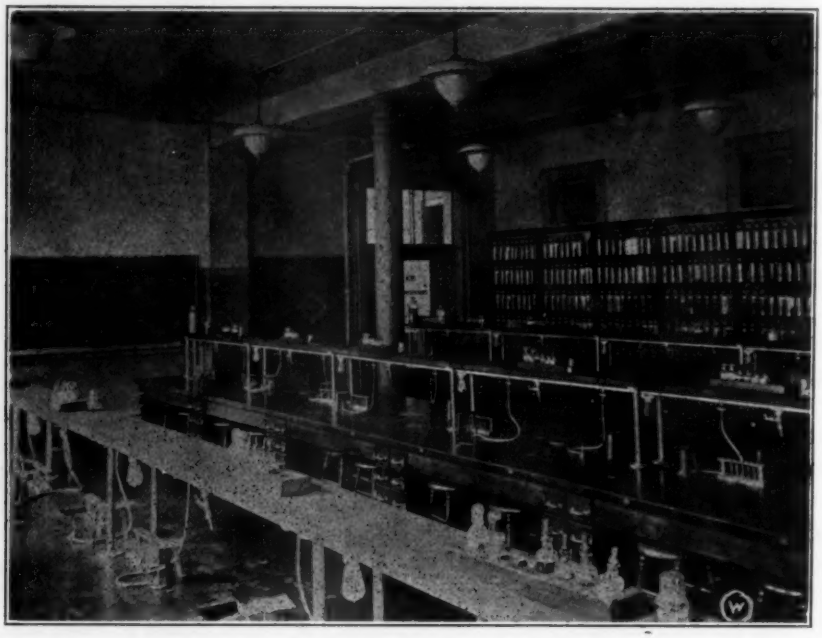

Fig. 2.—Another view of the Pharmacognosy Laboratory. University of Illinois School of Pharmacy, showing the blackboards and lantern screen. The collection on the right wall, (also partially seen in Fig. 1) includes samples of every drug of vegetable and animal origin ever official in the ten editions of the United States Pharmacopœia or in the five of the National Formulary.

official in the United States Pharmacopœia or the National Formulary. The other collection includes drugs official in prominent foreign pharmacopœias but never official in the U. S. P. or N. F.

Coming into the laboratory at the beginning of the course the student is assigned to his place, the microscope he is to use, and his kit. This latter (Fig. 3), consists of the usual microscopical kit consisting of slide boxes, slides, cover glasses, forceps, needles, labels, hand lens, ink, crowquill pen, etc., together with beakers, flasks, evaporating dish, funnel, mortar and pestle, separatory funnel, test-tubes, graduated cylinder, watch glasses, filters, litmus paper, etc., to be used in running the various tests. He also receives at this time a box containing four telescoping

trays each in turn holding twelve screw-cap homo-vials (Figs. 3 and 4) to be used for his collection of pure powders. He further supplies himself with a padlock for his kit drawer, the laboratory manual and a loose leaf note-book containing ruled and unruled sheets about 8 x 10 inches in size.

METHODS OF STUDY.

At approximately the same time as a drug is considered in Materia Medica it is also taken up in pharmacognosy. Each student receives an ample supply of drug both for study and for his own collection. In connection with the latter he receives a 5 x 7 manila envelope with clasp fastener which he uses as a container for the portion of drug he keeps for his own collection, placing whatever information he may desire upon the outside of the envelope. (Fig. 4.) If the powder is studied he also receives a sample of it which he keeps in one of the vials of his powder box for future use as checks in powdered drug examinations. The in-

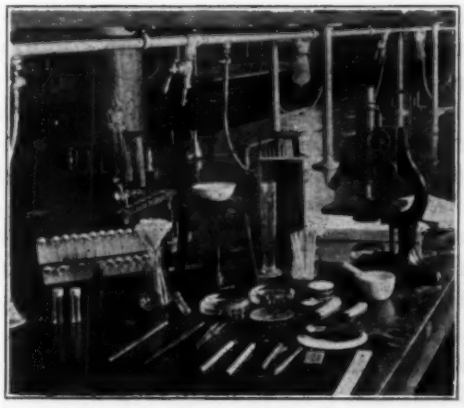

Fig. 3.—Apparatus used in Pharmacognosy. Each student receives a kit containing in addition to the usual microscopic apparatus (shown in the foreground), sufficient apparatus to run the official identity and purity tests as well as other tests on constituents.

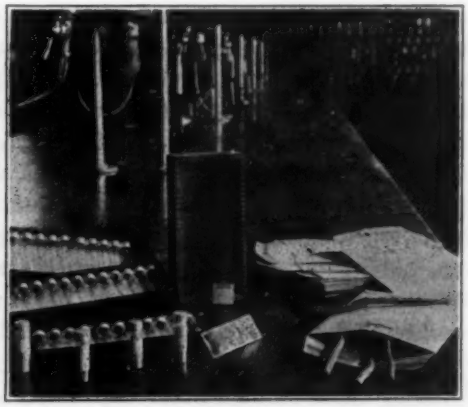

Fig. 4.—The items pictured above form the students personal collection, which, when completed at the end of the course, he takes with him. The telescopic box with four trays, at the left is used for powdered drugs. The slide box contains 30 mounted and stained specimens of cross- and longitudinal sections. The manila envelopes shown at right are 5 x 7 inches in size and are used as containers for whole drugs, of which the student has about 140 in his collection.

structor in charge opens the laboratory period with a brief discussion (usually illustrated with lantern slides) of the drugs to be studied during that period and the student then commences work. He writes a description of the drug, makes drawings of the entire drug, its cross-section and its powder, describes them in his notes, and performs the official identity and purity tests as well as others outlined in the manual. In order that his notes be not too long and that a fair degree of uniformity is maintained he uses the following outline for the notes:

OFFICIAL LATIN TITLE.

1. English title. Synonyms.
2. Definition. 3. Shape. Size.
4. External markings. Color.
5. Fracture. Internal color.
6. Odor. Taste. 7. Structure.
8. Constituents. Quality standards.
9. Tests for identity and purity. Common adulterants. 10. Dose. (Metric.)

Points 1 and 2 he copies from the Pharmacopœia or National Formulary. No's. 3, 4, 5, 6 and 7 are records of his own observations. In connection with structure (Point 7) he cuts his own sections or if this is impractical previously cut sections are distributed. His structure description includes descriptions of (1) the regions present with reference to their comparative size, (2) the tissues with regard to their arrangement in the regions, (3) the cells which compose the tissues and (4) the cell contents. Diagrams are usually made of the cross-section as also are tissue drawings from certain parts. If the powder is studied careful drawings of its elements are made and sizes recorded. The student is not required to memorize a structure description but he should be able to write such a description from a section before him. There is some item characteristic about every structure and that item is stressed. Furthermore, a knowledge of the structure as seen in sections is essential to an understanding of the elements seen in the powdered drug.

Constituents have been discussed by the instructor in his preliminary talk. Where identity tests depending upon constituents are available the student performs them. Among the common pharmacopœial tests of this nature are, the sclererythrin test for ergot, the Borntrager test and its modifications for anthraquinone drugs, the H_2SO_4 test for cubeb, the lead acetate test for acacia, the NaOH under althea, the $Ca(OH)_2$ and the $FeCl_3$ test under granatum, the Scoville organoleptic test for capsicum, etc. Various tests may be run upon alkaloids extracted from the drug by immiscible solvents. Drugs having sublimable constituents, as uva ursi, rhubarb, etc., may be microsublimed and subsequent tests run upon the sublimates. Where assays are given involving chemical reactions such as in black mustard the student writes the equations for these in his note-book. Standard requirements are of course, recorded.

Common adulterants of drugs are studied both microscopically and chemically. Among those studied microscopically are Bermuda grass in connection with triticum, starches with lycopodium and other drugs, calendula and carthamus with crocus, curcuma with mustards, curcuma and capsicum with ginger, pepper shells with pepper, close stems and fruits with clove, other cinnamons with the official cinnamon, mullein with digitalis, Japanese chillies with capsicum, phytolacca with belladonna root, etc. Among those involving tests the following serve as examples, gelatin in agar, ghatti gum and Mesquite gum in acacia, rosin in guaiac, gum Karaya in tragacanth, bdellium in myrrh, etc.

Some time ago the author called attention to the importance of the study of the constituents of drugs as a part of the laboratory curriculum in pharmacognosy,[1] and here again wishes to stress this most important phase of the work. The host of identity and purity tests, while simple to perform, leave a decided impression with the student, stimulating his interest not only in the constituents themselves and their reactions, but also in the activity of the drug. Furthermore, constituents will play by far the most important rôle in the pharmacognosy of the next generation.

The dose is included in the notes not because of any relation to our definition of pharmacognosy but rather because the memorizing of doses being a common stumbling block in Materia Medica, their repetition in pharmacognosy often serves to further stimulate an association between the drug and its posology.

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[1] Jour. A. Ph. A., 12 (1923), 196.

After performing and recording his tests and completing his notes and drawings the student places them in a folder which is turned in to the instructor. Drawings are first made lightly with pencil and then finished in India ink, students with an artistic bent often coloring them with crayon or water color, this latter, however, not being required. Each drawing bears a descriptive legend and the scale to which it is drawn. Drawings and notes must be completed during, and turned in at the close of the laboratory period. During such a 3-hour period one or two important drugs and one or two of lesser importance, involving only notes but no drawings, are studied.

Ratings in the course are based upon four counts: (1) Written recitations are given weekly and cover the drugs taken up during the previous week. These consist usually of ten questions bearing upon the identification, quality and purity of the drugs. (2) Drawings and notes, while turned in at each period, are rated collectively at about three-week intervals after which they are returned to the student who places them in proper order in his note-book. The complete note book is again checked at the end of the course. (3) Powdered drug unknowns are given about five times during each semester and include the powders previously studied of which the student has samples in his collection. These unknowns may consist of pure powders, adulterated powders or of mixtures, the student identifying the adulterants as well as the drugs. (4) Crude drug identification examinations are given about four times during each semester and include all whole drugs previously studied. About thirty drugs are given at one time, the student receiving a sheet ruled in three columns and numbered in the left margin. The drugs are placed in deep numbered boxes located about ten feet apart. Thirty students enter the room each taking his place at a box. A gong is sounded at 30-second intervals at each tap of which the student moves to the next box. During the 30-second interval he must identify the drug and write its official title, botanical source and dose. Such examinations are alternated with the type in which the student receives several drugs in one container which he separates and identifies.

The last two weeks of the second semester are spent in review and in practical examinations. During this time the student prepares three classifications of the drugs he has studied: (1) a taxonomical one, (2) a morphological one and (3) one based upon the chemical classification of active constituents. Tests are also given in writing descriptions of whole drugs, sections and powders from samples. An interesting exercise we have carried out during the past four years consists of giving the student five unknown powders, at least three of which he has not previously studied. He traces these down by a process of elimination in one of the various keys: Schneider's "Microanalysis of Powdered Drugs" or the author's Key for the "Identification of Powdered Drugs."[1] After tracing his powder he may obtain samples of pure powders for checking, no more than two such being allowed for any one unknown. Some 300 powders are used in this exercise and the mean class average for it over four years has been 94.3 per cent. Sometime during the course, usually at the beginning of the second semester the student prepares a set of 30 single- and double-stained cross-sections. While this has no value other than the technique involved it creates considerable interest and many students employ particular care in preparing a perfect set of mounts.

[1] This key is published in the last edition of "Kraemer's Pharmacognosy" (1928).

The number of drugs and their selection is often a problem in outlining a course in pharmacognosy. To include all of the drugs in the U. S. P. and N. F. would, of course, be impossible except if one had unlimited time or sped over them rapidly. It seems far better to limit the number and study them well. In selecting the drugs for the above course we first selected those classified as "*a*" and "*b*" drugs in Charters' "Basic Material for a Pharmaceutical Curriculum." This list, probably familiar to the reader, includes the drugs most frequently found in retail pharmacies. We then eliminated from this list such drugs as were too bulky or for some other reason were unsuitable to give to the student for his permanent collection, thus limiting ourselves to about 140 drugs. The total laboratory time of 200 hours is none too long for the study of these, only half of them being studied in sufficient detail to involve drawings. It is interesting, however, to note that practically all of the U. S. P. drugs are included in the list. Samples of powdered drugs given to the student for his permanent collection are limited to 48, these being selected according to their importance, a decided effort also being made to give samples representative of each group in the classification key.

The reader may ask, "Does the student ever see official drugs not taken up in the pharmacognosy course?" Ample opportunity for this is given. Museum specimens are always available and as a special inducement prominent window displays of all of the U. S. P. and N. F. and of several unofficial drugs together with their constituents are situated in the corridors. These displays are changed weekly accompanying the progress of the course in Materia Medica.

CONCLUSION.

What then does the student get out of pharmacognosy? First, he has learned to recognize the important vegetable and animal drugs both in their entire and powdered state. This he has learned to do by a logical and scientific study of their characteristics. Second, he is able to tell if the drug at hand is pure and of good quality, and third, and perhaps this is his greatest asset, he can read his pharmacopœia intelligently. He has studied the pharmacognosy of the drugs simultaneously with their materia medica and associates with the drugs all of that knowledge which Charters considers to be essential. Among the material things the student takes with him out of the course are, (1) a collection of some 140 crude drugs, and 48 pure powders, (2) a collection of 30 stained permanent mounts and (3) a note-book, in which many students highly pride themselves.

While the general revision of the course in pharmacognosy including the introduction of tests, the designing of laboratory furniture and equipment has been the work of the author, due credit must be given to his chief, Prof. E. N. Gathercoal, whose many helpful suggestions and constant kindly advice, encouragement and support have made many of the details a reality.

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FIRST AID METHODS FOR TREATING THE INJURED.

PREPARED UNDER THE DIRECTION OF THE SURGEON-GENERAL, UNITED STATES PUBLIC HEALTH SERVICE.

The United States Public Health Service advises that everyone become familiar with first-aid methods for treating the injured. First aid has been defined as the temporary care of an injured person by simple, commonsense methods, based on principles of medicine and surgery, that may be applied easily by persons not professionally trained in those subjects. *It should be noted that the work of first aid ceases when the injured person has been turned over to the care of a physician.*[1]

When it is remembered that over 28,000 persons are killed in the United States each year by traffic accidents—that is, by automobile, railroad, street car accidents, etc.,—over 13,000 by falls, more than 6000 each by burns and drowning, and more than 27,000 by other accidental means, or a total of more than 80,000 persons killed and over two million additional seriously injured by accidents in the United States each year, the importance of first-aid care is at once obvious. The above does not include the minor injuries, for which there are no statistics at the present time.

The common injuries include wounds with bleeding and possible infections, dislocation and fracture of bones, burns, including those caused by chemicals, and asphyxia, or cessation of respiration. The principles upon which first-aid are based are as follows:

First, cleanliness in caring for all open wounds. Persons administering first aid should be instructed not to touch or put anything on open wounds except a dry sterile compress or bandage compress. A bandage compress, which consists of several thicknesses of sterile gauze sewed to the middle of a strip of muslin, is used to cover all open wounds. Three sizes of compresses are used—large, medium and small. The compress should usually be covered by a protective dressing. A triangular bandage has been found very suitable for this purpose, as it can be adapted to cover any part of the body. The triangular bandage is used either in the open form or folded cravat. In addition to being used to protect the other dressings, it may be used as an improvised tourniquet and to hold splints in place. A triangular bandage may be made from any kind of cloth such as a handkerchief, piece of shirt, or napkin. It has been found, however, that a piece of muslin forty inches square, folded diagonally and cut across the long side, making two triangular bandages, is most satisfactory.

The second principle in first aid is the control of hemorrhage, or bleeding. Hemorrhage from a cut artery flows rapidly in spurts or fine jets, giving little time for the blood to coagulate or clot. The blood is bright red. Blood from a vein,

[1] EDITOR'S NOTE.—Attention is called to the fact that unscrupulous persons have taken advantage of kindly acts to secure damages from those whose sympathies and humanity persuaded them to give aid. The charges in the cases in mind were technical and not all persons adhere to the truth when their desire for money gets the better of them. Members of the A. PH. A. will find reference to cases in May JOURNAL, A. PH. A., page 485. A firm, known to the writer, had a related experience many years ago in which permanent injury was alleged but fortunately (disastrously for the plaintiff and his attorneys) the attempted deception was uncovered by a special jury of physicians. The comment is made so that pharmacists will be guarded in their actions.

being under less pressure flows steadily, but it may be rapid if from a large vein. It is dark in color. Bleeding from small arteries can often be controlled by direct pressure, but it is generally best to apply a tourniquet immediately, between the wound and the heart. Bleeding from a vein can usually be stopped by simply pressing a pad of sterile gauze over the wound and then elevating the part, having the patient lie down. Anything that makes the heart beat faster increases hemorrhage; hence in all cases of severe bleeding the patient should be kept in a recumbent or semi-recumbent position and as quiet as possible.

The third principle is the restoration of breathing after electric shock, apparent drowning, and poisoning by gases, as by carbon monoxide gas or illuminating gas. This treatment is by artificial respiration. Any method of artificial respiration may be used. For the ordinary person rendering first aid, the Schaefer, or prone pressure, method is the simplest and is not as tiresome as some of the other methods. Recently a conference was held at which representative of the United States Public Health Service, the United States Bureau of Mines, the American Red Cross, and other national organizations were present for the purpose of deciding upon a uniform technique. This technique is very simple and anyone can learn it in a short time. It is as follows:

(*a*) Lay the patient on his belly, one arm extended directly overhead, the other arm bent at elbow and with the face turned outward and resting on hand or forearm so that the nose and mouth are free for breathing.

(*b*) Kneel, straddling the patient's thighs with your knees placed at such a distance from the hip bones as will allow you to place the palms of your hands on the small of the patient's back with your fingers resting on the ribs, the little finger just touching the lowest rib, with your thumb and fingers in a natural position, and the tips of your fingers just out of sight.

(*c*) With your arms held straight, swing forward slowly so that the weight of your body is gradually brought to bear upon the patient. Your shoulders should be directly over the heel of your hand at the end of the forward swing. Do not bend your elbows. This operation should take about two seconds.

(*d*) Now immediately swing backward so as to completely remove the pressure, thus returning to the first position.

(*e*) After two seconds, swing forward again. Thus repeat deliberately 12 to 15 times a minute the double movement of compression and release, a complete respiration in four or five seconds.

(*f*) Continue artificial respiration without interruption until natural breathing is restored or until a physician declares the patient is dead.

(*g*) As soon as this artificial respiration has been started and while it is being continued, an assistant should loosen any tight clothing about the patient's neck, chest, or waist. Keep the patient warm. Do not give any liquids whatever by mouth until the patient is fully conscious.

(*h*) To avoid strain on the heart when the patient revives, he should be kept lying down and not allowed to stand or sit up. He should be given some stimulant, such as one teaspoonful of aromatic spirit of ammonia in a small glass of water or a hot drink of coffee or tea. The patient should be kept warm.

(*i*) Resuscitation should be carried on at the nearest possible point to where the patient received his injuries. He should not be moved from this point until he is breathing normally of his own volition and then moved only in a lying position. Should it be necessary to move the patient before he is breathing normally, resuscitation should be carried on during the time that he is being moved. A brief return of natural respiration is not a certain indication for stopping the resuscitation. Not infrequently the patient, after a temporary recovery of respiration, stops breathing again. The patient must be watched and if natural breathing stops, artificial respiration should be resumed at once.

(*j*) In carrying out resuscitation it may be necessary to change the operator. This change must be made without losing the rhythm of respiration. By this procedure no confusion results at the time of change of operator and a regular rhythm is kept up.

The fourth principle relates to dislocations and fractures of bones, which are treated by immobilization in a comfortable position, and a natural one if practicable, care being taken not to move the injured part unnecessarily. Well-padded splints are held in place by cravat bandages.

Fifth, burns are treated, after removal of the clothing, by use of sterile or sterile picric acid gauze and an outer dressing, as a triangular bandage, to hold the gauze in place and exclude the air. The exclusion of air is important. Precautions of cleanliness should be observed as stated for open wounds.

Sixth, shock, or vital depression, which accompanies all injuries to same degree, is treated by keeping the patient lying down at rest; keeping him warm by covering him with blankets or clothing, using hot water bottles, hot bricks, or similar means, aiding circulation by rubbing the extremities towards the heart, but not away from it; and by the use of common stimulants, as hot coffee or aromatic spirit of ammonia.

Seventh, transportation may be necessary to get an injured man to a place of safety, or to a more comfortable location, or to get him to a hospital and a physician. The methods vary with conditions, but the principle of transporting him so that he will suffer no further injury is important, whether he is transported on a stretcher or by one, two, three, or more persons.

In summarizing, the most important thing in the care of the injured person is *Prevention*—the reduction of accidents to a minimum by education and legislation. But as this minimum can never be zero, it is well to bear in mind the fundamental principles in first aid care, which are as follows:

1. Asepsis or cleanliness in caring for open wounds.
2. Control of hemorrhage by pressure and position of injured part.
3. Treatment of shock by keeping patient at rest and warm and by giving simple stimulants.
4. Artificial respiration in asphyxia, electric shock, combined with the use of pure oxygen in carbon monoxide cases.
5. Asepsis in treatment of burns; protection from air if this can be done with aseptic method; antisepsis and some relief of pain by use of picric acid gauze.
6. Immobilization of dislocations and fractures.
7. Transportation by methods that will not increase the extent of the injury.

In addition to the benefits gained by the early care of the injured, first aid has been found actually to tend to lower accidents by making people more careful.

POISON IVY REMEDIES.

Through the medium of the U. S. Department of Agriculture the press has been informed of the effectiveness of potassium permanganate as a treatment for ivy poisoning—a 1 per cent solution is applied. The *Science News* of recent date, has given publicity to a preventive formula devised by Dr. James B. McNair, of the Field Museum, Chicago, consisting of a 5 per cent solution of ferric chloride in a 50–50 mixture of water and glycerin. This is to be washed on all exposed parts of the skin and allowed to dry there before going where the poison ivy and related weeds grow. The iron salt combines with the poisonous principle of the ivy, and changes it into a harmless, non-poisonous compound.

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NEW AND NONOFFICIAL REMEDIES.

The following additional articles have been accepted as conforming to the rules of the Council on Pharmacy and Chemistry of the American Medical Association for admission to New and Nonofficial Remedies. A copy of the rules on which the Council bases its action will be sent on application.

W. A. PUCKNER, *Secretary.*

STEARODINE.—Calcium Iodostearate.—$[CH_3(CH_2)_7CHI(CH_2)_8CO_2]_2Ca$. — It contains from 26 to 28 per cent of iodine in organic combination.

Actions and Uses.—Stearodine is used as a substitute for the inorganic iodides, over which it is claimed to have an advantage in that it is longer retained and therefore better utilized. See Iodized Fats and Fatty Acids, New Nonofficials Remedies, 1928, page 212.

Dosage.—For prophylaxis of goiter, 0.01 Gm. weekly or biannual series of six weeks' treatment consisting of 0.01 Gm. daily.

Manufactured by Parke, Davis & Co., Detroit. No U. S. patent or trademark.

Stearodine Tablets: Each contains stearodine, equivalent to 0.01 Gm. of iodine. This dosage form is used only for prophylaxis against goiter and for the treatment of simple goiter.

Stearodine is a cream colored solid, almost odorless, insoluble in water, soluble in chloroform, ether and benzin.

When stearodine is agitated with diluted nitric acid, the filtrate responds to tests for calcium. When a small quantity of stearodine is warmed with strong sulphuric acid, violet vapors of iodine are evolved.

Agitate about 1 Gm. stearodine with diluted nitric acid: the filtrate is not rendered distinctly turbid by the addition of silver nitrate solution (*absence of inorganic iodide*).

Mix about 0.1 Gm. of stearodine, weighed accurately, with 2 Gm. of sodium hydroxide in a nickel crucible and fuse the mixture gently. Allow the fusion to cool somewhat; add 8 Gm. of fusion mixture (sodium carbonate, potassium carbonate and potassium nitrate) and heat strongly until a clear liquid results. Allow the fusion to cool, dissolve the mass in 250 cc. of water; add 30 cc. sodium hypochlorite solution containing 2.5 per cent available chlorine; after five minutes acidify with an excess of phosphoric acid and heat until all free chlorine has been expelled; add an excess of sodium iodide and titrate the free iodine with tenth normal sodium thiosulphate: each cubic centimeter of tenth normal sodium thiosulphate consumed corresponds to 0.0126 Gm. of iodine; the iodine content found is not less than 26 per cent and not more than 28 per cent.

From *Jour. A. M. A.*, May 26, 1928.

POLLEN EXTRACTS-SWAN-MYERS (See New and Nonofficial Remedies, 1928, page 38).

Also marketed in packages of one vial containing, 2000 units.

CONCENTRATED POLLEN EXTRACTS-SWAN-MYERS (See New and Nonofficial Remedies, 1928, page 30).

The following product has been accepted:

Biennial Sage Concentrated Pollen Extract-Swan-Myers.

Prepared by the method given for concentrated pollen extracts-Swan-Myers (New and Nonofficial Remedies, 1928, page 30).

DEXTROSE (See New and Nonofficial Remedies, 1928, page 244).

The following dosage forms have been accepted:

Glaseptic Ampoules Solution Glucose, 50 per cent, 20 cc.: Each ampule contains dextrose, U. S. P., 10 Gm., in distilled water, to make 20 cc.; buffered with sodium citrate, 0.25 per cent.

Prepared by Parke, Davis & Co., Detroit.

Glaseptic Ampoules Solution Glucose, 50 per cent, 50 cc.: Each ampule contains dextrose, U. S. P., 25 Gm., in distilled water, to make 50 cc.; buffered with sodium citrate, 0.25 per cent.

Prepared by Parke, Davis & Co., Detroit.

From *Jour. A. M. A.*, June 16, 1928.

The National Drug Clerk gave the last bulletin of the Public Health Service, dealing with "First Aid" editorial recognition and place in the editorial columns.

† Deceased.

PERSONAL AND NEWS ITEMS.

Secretary E. F. Kelly, who has been attending Western and Pacific Coast State Pharmaceutical Associations, has been heartily welcomed. He brought the message of pharmacy to all of these members. Possibly the essence of his addresses is expressed in the message which he gave to the *Weekly Information Letter*, July 3rd, issued by Secretary W. Bruce Philip. In all of his addresses he stressed the importance of pharmacy as the cornerstone of the drug business. We quote part of the message referred to:

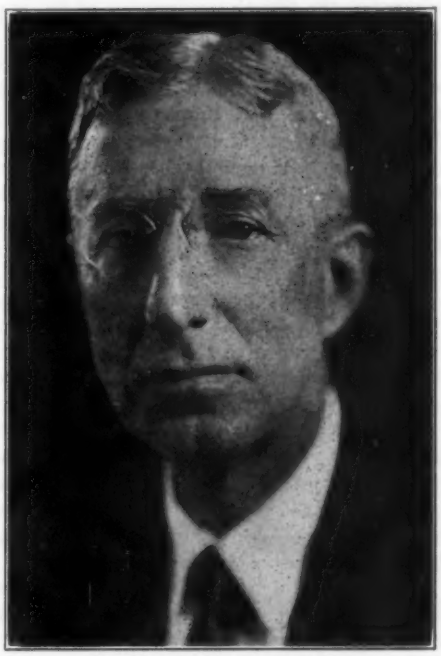
"I am happy to have this opportunity to extend to you the greetings of the A. PH. A. This visit to the meetings of the State Pharmaceutical Associations of the Pacific slope is made to establish a closer contact between the A. PH. A. and the druggists of this wonderful section of our country, and I wish it were possible to meet each one of you personally. In particular I desire to express our sincere appreciation for the interest in and support of the Pharmacy Headquarters Building. A splendid site has been secured for the building in Washington, D. C., facing on the Mall and directly opposite the Lincoln Memorial, and this site insures that the building will be so prominently located as to bring our profession pointedly to the attention of the American public. Plans for the building are now being worked out and it is hoped to have it completed by 1930. Of the total of $1,000,000.00 needed, about $725,000.00 has been subscribed by approximately 15,000 persons and firms connected with Pharmacy. Subscriptions are being received right along and it is expected that the entire amount will be subscribed by the time buliding operations are begun. Of the amount subscribed, about $325,000.00 has been paid in and as all expenses of the campaign are being paid by the ASSOCIATION, the entire amount received will be used for the building."

Secretary Kelly has also expressed his appreciation of the cordiality of sister organizations.

F. H. King, of Delphos, Ohio, has been appointed member of the Ohio State Board of Pharmacy for the seventh consecutive time, he has now served for nearly 30 years. In recognition of his services to pharmacy the Ohio Northern University conferred upon him the degree of "Doctor of Pharmacy," and the President of the University, Albert Edwin Smith, invited Dr. and Mrs. King to be guests of honor at his Commencement Day dinner.

F. H. KING.

Surgeon-General Hugh S. Cumming has been appointed for the third term of office and the Senate promptly confirmed his appointment. Dr. Cumming entered the service thirty-four years ago—a period during which wonderful strides have been made in medicine



DR. HUGH S. CUMMING.
Surgeon-General U. S. Public Health Service.

and in the development of Public Health work. *The New York Times Magazine* of June 10th, devoted a page depicting the Surgeon-General and his activities; the sketch was prepared by Oliver McKee, Jr. Dr. Cumming will be a guest of the AMERICAN PHARMACEUTICAL ASSOCIATION in Portland and deliver an address on Thursday, August 23rd.

Dr. James A. Spalding, a veteran in the practice of medicine, author and historian—a grandson of Lyman Spalding, "father of the U. S. Pharmacopœia," will attend the meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION. He has consented to speak briefly before the Section on Historical Pharmacy.

A veteran of the ASSOCIATION, with more years to his credit than the former will celebrate his 90th birthday at Portland, namely, **W. L. DuBois,** of Catskill, N. Y.

The Senior Past-President, J. U. Lloyd will attend the meeting in Portland and his son, Dr. T. J. Lloyd, will deliver an illustrated lecture before the Section on Historical Pharmacy.

D. M. Gray, Vice-President and Secretary of Frederick Stearns and Committee, recently celebrated the fiftieth anniversary of his connection with the firm.

Dr. J. C. Munch, who has been associated with, and in charge of, the Pharmacological Laboratory of the Bureau of Chemistry (called Food, Drug and Insecticide Administration since July 1, 1927), has succeeded Dr. Pittenger as Director of the Pharmacologic Research Laboratories of Sharp & Dohme. Dr. Pittenger has recently been promoted to a more responsible position.

In 1921 Dr. Munch came to the Pharmacological Laboratory of the Bureau of Chemistry, where research has been conducted upon the toxicity of arsenic, lead, zinc and other heavy metals, aliphatic alcohols, alkyl esters, dyes and food preservatives. For the past several years his particular attention has been directed to the application of pharmacology to biologic assays and with his associates he has prepared and distributed the official U. S. P. X bio-assay standards.

Exposure to nitric acid fumes while engaged in an extensive pharmacological and toxicological study of the effect of lead arsenite upon various animals caused a rather severe impairment of one lung, and led to Dr. Munch's separation from the F. D. I. Administration. After spending several months in the Mohave Desert in Las Vegas, Nev., he has practically recovered his health.

MOTION MADE AT A MEETING OF A PRELIMINARY CONFERENCE ON SIMPLIFICATION OF GLASS CONTAINERS USED IN DRUG AND PHARMACEUTICAL INDUSTRIES, JULY 6TH.

Motion was made and unanimously carried that a joint standardization and simplification committee be appointed to consist of one voting delegate and two associate delegates from each of the National drug and pharmaceutical associations and the Glass Container Association of America in coöperation with the United States Department of Commerce for coördinating the efforts of the various groups concerned in the simplification and standardization of glass containers used in the drug and pharmaceutical industries.

It was also the sense of the meeting that the appointment of the committee be completed as soon as possible with the view of holding its first meeting during the week of August 6th for the purpose of organization and that this first meeting be held at the Department of Commerce under the auspices of the Division of Simplified Practice.

It was further resolved that Mr. W. E. Braithwaite of the Division of Simplified Practice of the Department of Commerce be authorized to communicate with all associations concerned and to promptly secure the appointment of delegates as provided for in this resolution.

BAYLOR UNIVERSITY PHARMACY ALUMNI ASSOCIATION.

Efforts are on foot for the establishment of an alumni association of Baylor University College of Pharmacy, located in Dallas. This plan received great impetus at a banquet held on the night following the graduation exercises of the College, in the Junior Ball Room of the Adolphus Hotel to which all Baylor Pharmacy graduates since the establishment of the school were invited. Hosts on this occasion were the drug interests of the city of Dallas, while local alumni constituted the reception committee. E. G. Eberle was one of the founders and organizers of the departments of Baylor University at Dallas now constituting those of Medicine, Pharmacy, Dentistry and the School for Nurses.

Since the foregoing item was received the association has been organized with Zeb Rike, of Farmersville, *President;* D. B. Blaine, Dallas, *Vice-President;* A. B. White, Dallas, *Secretary,* Morgan Fletcher, *Treasurer.*

OBITUARY.

GEORGE MAHLON BERINGER.

George Mahlon Beringer, sixty-first President of the AMERICAN PHARMACEUTICAL ASSOCIATION, died June 23rd, at his home in Collingswood, N. J., aged 68 years. Few retail pharmacists have been so closely identified with pharmacy in its several divisions as Mr. Beringer; he chose pharmacy for his life work as a youth and continued in the service until his passing, and during these years of active life he had been apprentice, pharmacy owner, educator, manufacturer and wholesaler and was always ready to work for those engaged in the drug business, pharmacy, for the development of business in general, the municipality and the state and country. Careful, and perhaps critical in many of his engagements; he was sometimes misunderstood, but he stood firmly for whatever he deemed right; there was never a question about his position.

GEORGE M. BERINGER.

Mr. Beringer was editor of the *American Journal of Pharmacy* from 1917–1921 and at the time of his demise member of the Committee on Publications of the A. PH. A. He was a member of the Committee of Revision of the U. S. Pharmacopœia, 1910 and 1920, and of the Committee on National Formulary since 1908, in the work of which his comprehensive knowledge of pharmacy and allied sciences and his critical judgment did much to advance the practicality of these standards. Many references to the activities of the deceased have been made and published. Chairman E. Fullerton Cook said: "Mr. Beringer's death has left a place hard to fill in American pharmacy—in the AMERICAN PHARMACEUTICAL ASSOCIATION, in the Pharmacopœial field, and in the practical knowledge of professional pharmacy his influence has been powerful and uplifting."

Mr. Beringer was trained by Charles Bullock, and the latter by Daniel B. Smith, the first President of the A. PH. A., therein we can discern that influences impress the individual—early in life, like his predecessors, the deceased became a devotee of research—his contributions to scientific organizations and periodicals have been many and of great scientific and practical value.

A Camden paper speaks of him as follows: "One of Camden's leading business men, Dr. Beringer always was active in the civic life of Camden, and figured in many movements for the betterment of the city. He was active in the condemnation proceedings which paved the way for the construction of the Delaware River Bridge as a member of the City Planning Commission. As a Rotarian, he was one of the founders of the club's educational fund."

The publications of the AMERICAN PHARMACEUTICAL ASSOCIATION speak of his activities therein. He was President of the New Jersey Pharmaceutical Association in 1905 and for many years one of its most active members. The Pennsylvania Pharmaceutical Association elected him an honorary member, and he also held membership in the Academy of Natural Sciences, Botanical Club, of Philadelphia; American Chemical Society, etc. He was awarded the Remington Honor Medal in 1924.

Remington Honor Medal.

Mr. Beringer was a director of the Camden Board of Trade, for some years he was city chemist and consultant for the State. He was one of the organizers and officers of the Camden Guarantee Building & Loan Association. He succeeded to the business of the late Albert P. Brown in 1892, when he resigned from Bullock & Crenshaw, with which firm he had been associated, in advancing positions, for more than ten years.

The deceased was born, February 3, 1860, the son of Levi D. and Rebecca Beringer, of Philadelphia. Here he received his education, graduating from Central High School in 1876 and from the Philadelphia College of Pharmacy in 1880; in 1903 his *Alma Mater* honored him with the degree of Master in Pharmacy and the New Jersey College of Pharmacy, in 1914, conferred upon him the degree of Doctor of Pharmacy. (For more extended sketch see JOURNAL A. PH. A., for May 1924, page 460.) Mr. Beringer was a life member of the Philadelphia College of Pharmacy and Science; for many years he was trustee of the institution and for more than ten years chairman of the Board.

Mr. and Mrs. Beringer (née Estella F. Wolfe) were married October 3, 1882; the latter and one son, George M., Jr., survive. Ex-Presidents represented the AMERICAN PHARMACEUTICAL ASSOCIATION at the funeral ceremonies and expressed the high regard in which the deceased was held by his confréres, associates and friends.

MABEL A. (BAUER) STEGMAYER.

Mrs. Mabel A. Stegmayer, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1922, died May 3rd at the home of her parents in New York City. The deceased, before her marriage, was Miss Mabel A. Bauer; she graduated from the New York College of Pharmacy in 1922, afterward taking a post-graduate course in Blood work.

For three years she was Technician of Christ Hospital, Jersey City; later engaging with the Lederle Laboratories in bacteriological research work. The father and an infant son survive the deceased.

DEATH OF MRS. LAIRD J. STABLER.

We are advised, but have no details of the death of Mrs. Stabler, wife of Dean Laird J. Stabler, of the University of Southern California, College of Pharmacy, Los Angeles. The death, we understand, was the result of an automobile accident in which the Dean was very seriously injured. Sympathy is expressed and the hope that Professor Stabler will recover.

Edward Granville Nellis, President of the Chemical Catalog Company and also of the Pencil Points Press, New York City, died June 26th at his summer home in Quogue, L. I. He was forty-nine years old and had been in poor health for some months. In 1915 Mr. Nellis, with S. W. Robinson and Ralph Reinhold, founded the Chemical Catalog Company. A widow and two daughters survive the deceased.

Henry S. Dulaney, Baltimore, died July 8th, aged 79 years. For thirty years the deceased was associated with the Resinol Company. During late years he was prominently identified with the Anti-Saloon League.

SERIOUS THROAT INFECTION TRACED TO MILK SUPPLY.

A throat infection which has cost the lives of a score or more in Lee, Mass., has been traced to a milk supply. As a result of finding the source the epidemic is under control. A few cases, however, have appeared in other sections of the country.

NEW POWERFUL LIGHT ON OLD PORTLAND HEAD.

Portland Head Light, at entrance of Portland (Me.) Harbor, which has been a fixed white beacon since 1791, will soon change its characteristic light to a flash. Its power will be raised from 3800 to 32,000 candle power, and a two-second flash will be followed by a two-second interval of darkness.

Over the keeper's desk in the tower is a framed copy of the commission issued to the first keeper of the light in 1791. The keeper was Joseph Greenleaf and the commission was signed by George Washington.

This picturesque beacon was the first lighthouse to be built in Maine and is also one of the oldest on the North Atlantic coast. On Christmas Eve, 1886, the bark Annie C. Maguire, with a cargo of tea from the East Indies for Portland, ran full tilt in a fog on the rocks of Portland Head within a stone's toss of the light. The crew was saved but the vessel was a total loss.

SOCIETIES AND COLLEGES.

SEVENTY-SIXTH ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, EASTLAND HOTEL, PORTLAND, ME., AUGUST 20 TO 25, 1928.

A few additions will be made to programs of the Sections and the other bodies which will appear in the program now being completed for the meetings.

Aside from the entertainment features the following information will be of particular interest: Dr. Hugh S. Cumming, of the United States Bureau of Public Health Service, will deliver an address on Thursday afternoon, August 23rd.

It is expected that Dr. Percy May, well and favorably known scientist of London, England, will be present on one or more days of the Convention.

There will be several illustrated lectures in the Scientific Section and in the Section on Historical Pharmacy. Dr. James A. Spalding, grandson of the "Father of the U. S. Pharmacopœia," Lyman Spalding, will give a brief address before the latter Section. The Governor of the State of Maine and the Mayor of Portland will also speak, at a time to be selected.

Hotel Rates.

The Eastland Hotel has quoted rates as follows: single room, without bath, $3.00 and up; with bath $4.00 and up. Double room without bath, $5.00 and up; with bath, $6.50 and up. The Eastland and Congress Square Hotels are under one roof and the Local Committee has assurance that the Eastland will take care of all members and provide rooms at other hotels should it become necessary.

Rail Road Rates.

Do not forget to purchase your tickets on the Certificate Plan, no matter how near or far you may come. Tickets will be on sale August 16th, honored for return to August 29th.

Entertainment features of the week follow:

Program of Entertainments.

MONDAY, AUGUST 20TH.

2:00 P.M. Visit to the Longfellow Home (for the ladies).
9:30 P.M. Informal Dance.

TUESDAY, AUGUST 21ST.

2:00 P.M. Auto Trip to Fort Williams (for the ladies).
6:30 P.M. American Pharmaceutical Association—Banquet, followed by dancing.

WEDNESDAY, AUGUST 22ND.

2:00 P.M. Card Party (for the ladies).
9:30 P.M. Informal Dance.

THURSDAY, AUGUST 23RD.

12:00 M. Veterans' Lunch (for men only). (Fraternity and Alumni Luncheons will be arranged for.)
2:30 P.M. Address by Surgeon-General Hugh S. Cumming, U. S. Public Health Service.
2:30 P.M. Auto Ride (for the ladies).
8:00 P.M. Card Party (for the ladies).

FRIDAY, AUGUST 24TH.

1:15 P.M. Organ Recital (Municipal Organ) in City Hall.

SATURDAY, AUGUST 25TH.

10:30 A.M. Sail among the Islands in Casco Bay, followed by a Grand Shore Dinner.

General Program for the Seventy-Sixth Annual Meeting, A. Ph. A.

All official sessions of the meeting will be held in the Eastland Hotel, Portland, Me.

SATURDAY, AUGUST 18TH.

9:30 A.M. National Conference on Pharmaceutical Research.
2:00 P.M. National Conference on Pharmaceutical Research.

MONDAY, AUGUST 20TH.

9:00 A.M. Meeting of the Council, A. Ph. A.
9:00 A.M. National Association Board of Pharmacy.
9:00 A.M. American Association of Colleges of Pharmacy, Teachers' Con-

ferences.—Chemistry Section; Practical Pharmacy Section; Materia Medica, Pharmacognosy and Botany Section; Commercial Pharmacy Section.

2:00 P.M. National Association Boards of Pharmacy.

2:00 P.M. American Association of Colleges of Pharmacy.

2:00 P.M. Visit to the Longfellow Home (for the ladies).

6:00 P.M. American Association of Colleges of Pharmacy, Dinner.

8:00 P.M. National Association Boards of Pharmacy.

8:00 P.M. American Association of Colleges of Pharmacy.

9:30 P.M. Informal Dance.

TUESDAY, AUGUST 21ST.

8:30 A.M. Joint Session National Association Boards of Pharmacy and American Association of Colleges of Pharmacy.

1:30 P.M. First Session House of Delegates, A. PH. A.

2:00 P.M. Auto Trip to Fort Williams (for the ladies).

2:30 P.M. National Association Boards of Pharmacy.

2:30 P.M. American Association of Colleges of Pharmacy.

6:30 P.M. AMERICAN PHARMACEUTICAL ASSOCIATION—Banquet, followed by dancing.

WEDNESDAY, AUGUST 22ND.

9:00 A.M. First General Session, A. PH. A.

2:00 P.M. House of Delegates, A. PH. A.

2:00 P.M. Card Party (for the ladies).

4:30 P.M. Conference of Pharmaceutical Association Secretaries.

8:00 P.M. First Session Scientific Section.
First Session Section on Commercial Interests.
First Session Section on Historical Pharmacy.

9:30 P.M. Informal Dance.

THURSDAY, AUGUST 23RD.

9:00 A.M. Council, A. PH. A.

9:00 A.M. First Session Section on Education and Legislation.
First Session Section on Practical Pharmacy and Dispensing.
Second Session Section on Historical Pharmacy.
Remarks by James A. Spalding, grandson of the "Father of the U. S. Pharmacopœia."

12:00 M. Luncheon of Veteran Druggists.

2:00 P.M. General Session, A. PH. A.
Address by Dr. Hugh S. Cumming, Surgeon-General, U. S. Bureau of Public Health Service.

2:30 P.M. Auto Ride (for the ladies).

4:30 P.M. Conference of Pharmaceutical Association Secretaries.

8:00 P.M. Joint Session Scientific Section and the Section on Practical Pharmacy and Dispensing.
Second Session Section on Commercial Interests.

8:00 P.M. Card Party (for the ladies).

FRIDAY, AUGUST 24TH.

9:00 A.M. House of Delegates, A. PH. A.

1:15 P.M. Organ Recital (Municipal Organ) in City Hall.

2:30 P.M. Second Session Scientific Section.
Second Session Section on Practical Pharmacy and Dispensing.
Second Session Section on Education and Legislation.

7:00 P.M. Final Session House of Delegates.

9:00 P.M. Final General Session, A. PH. A.

10:30 P.M. Reorganization Meeting of the Council, A. PH. A.

SATURDAY, AUGUST 25TH.

10:30 A.M. Sail among the Islands in Casco Bay, followed by a Grand Shore Dinner.

We will appreciate assistance in making corrections and additions in this program so the official program will be free from errors.

THE GENERAL SESSIONS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Association Officers: *President,* C. W. Johnson; *Honorary President,* Edward Mallinckrodt;† *First Vice-President,* Ambrose Hunsberger; *Second Vice-President,* Joseph Jacobs; *Secretary,* E. F. Kelly; *Treasurer,* C. W. Holton; *Editor of the Journal,* E. G. Eberle; *Editor of the Year Book,* A. G. DuMez.

† Deceased.

Officers Elect: *President,* David F. Jones; *First Vice-President,* A. W. Pauley; *Second Vice-President,* W. H. Zeigler; *Members of the Council,* H. C. Christensen; H. A. B. Dunning; S. L. Hilton.

Sessions: Wednesday, August 22nd, 9:00 A.M.; Thursday, August 23rd, 2:00 P.M.; Friday, August 24th, 9:00 P.M.

WEDNESDAY, AUGUST 22nd, 9:00 A.M.—*First General Session.*

1. Reading of Communications.
2. Report of the Secretary, E. F. Kelly.
3. Report of the Treasurer, C. W. Holton.
4. Annual Report of the House of Delegates.
5. President's Address.
6. New Business.

THURSDAY, AUGUST 23rd, 2:00 P.M.—*Second General Session.*

1. Minutes of the First General Session.
2. Reading of Communications.
3. Report of the House of Delegates.
4. Report of the Headquarters Building Campaign Committee.
5. Report of the Headquarters Building Site Committee.
6. Report of the Headquarters Building Plans Committee.
7. Address, Dr. Hugh S. Cumming, Surgeon-General, U. S. Bureau of Public Health Service.
8. Unfinished business.
9. New business.

FRIDAY, AUGUST 24th, 9:00 P.M.—*Final General Session.*

1. Minutes of the Second General Session.
2. Final Report of the House of Delegates.
3. Presentation of the Ebert Prize.
4. Unfinished Business.
5. Installation of Officers.
6. Final Adjournment.

COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Officers and Members of the Council: *Chairman,* S. L. Hilton; *Vice-Chairman,* Charles H. LaWall; *Secretary,* E. F. Kelly; H. C. Christensen, S. L. Hilton, J. A. Koch, J. H. Beal, W. B. Day, C. H. LaWall, H. V. Arny, G. M. Beringer,† T. J. Bradley.

Ex-Officio Members: *President,* C. W. Johnson; *First Vice-President,* Ambrose Hunsberger; *Second Vice-President,* Joseph Jacobs; *Secretary,* E. F. Kelly; *Treasurer,* C. W. Holton; *Editor of the Journal,* E. G. Eberle; *Editor of the Year Book,* A. G. DuMez; *Chairman of the House of Delegates,* L. A. Seltzer.

Sessions: Monday, August 20th, 9:00 A.M.; Thursday, August 23rd, 9:00 A.M.; Friday, August 24th, 10:30 P.M.—Reorganization Meeting of the Council.

HOUSE OF DELEGATES OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Officers: *Chairman,* L. A. Seltzer; *Vice-Chairman,* Ambrose Hunsberger; *Secretary,* E. F. Kelly.

Sessions: Tuesday, August 21st, 1:30 P.M.; Wednesday, August 22nd, 2:00 P.M.; Friday, August 23rd, 9:00 A.M., and 7:00 P.M.—Final Session of the House of Delegates.

TUESDAY, AUGUST 21st, 1:30 P.M.—*First Session.*

1. Call to Order.
2. Roll Call of Delegates.
3. Reading and Adopting of the Minutes.
4. Opening Remarks by the Chairman, Leonard A. Seltzer.
5. Appointment of Committee on Nominations.
6. Appointment of Committee on Resolutions.
7. Receipt of the Annual Report of the Council.
8. Receipt of resolutions, reports and other communications, all of which must be in writing.
9. New Business.
10. Adjournment.

WEDNESDAY, AUGUST 22nd, 2:00 P.M.—*Second Session.*

1. Call to Order.
2. Roll Call of Delegates.
3. Reading and Adopting of the Minutes.
4. Receipt of reports and other communications from the ASSOCIATION, the Council and the Sections. Reports of the Committees on Local Branches, on Partial Formulas Disclosure Legislation, on Membership, on State and National Legislation, on the U. S. P. and on the Recipe Book will be received.
5. Receipt of resolutions, reports and other communications, all of which must be in writing. Reports of the Committees

† Deceased.

on Nominations, on Resolutions and on Place of Meeting will be received.
6. New Business.
7. Unfinished Business.
8. Nomination of officers of the ASSOCIATION (three candidates each for the offices of President, First Vice-President and Second Vice-President, and nine candidates for the Council) to be elected by mail ballot.
9. Election of the Honorary President, Secretary and Treasurer of the ASSOCIATION upon nomination of the Council.
10. Election of the Chairman and Vice-Chairman of the House of Delegates.
11. Selection of the Place of the next annual meeting.
12. Adjournment.

FRIDAY, AUGUST 23rd, 9:00 A.M.—*Third Session.*

1. Call to Order.
2. Roll Call of Delegates.
3. Reading and Adopting of the Minutes.
4. Receipt of reports and other communications from the ASSOCIATION, the Council and the Sections.
   Reports of the Committees on Horticultural Nomenclature, on Physiological Testing, on Weights and Measures, on the William Procter, Jr., Memorial Fund, on International Pharmaceutical Nomenclature, on Standard of Drugs and Chemical Products, on Coöperative Publicity, on Pre-Requisite Legislation, on Biological Products and on Pharmacy Week, will be received.
5. Receipt of resolutions, reports and other communications all of which shall be in writing, Reports of the Committees on Resolutions, on Patents and Trade Marks and on Status of Pharmacists in the Government Service will be received.
6. Unfinished Business.
7. New Business.
8. Adjournment.

FRIDAY, AUGUST 23rd, 7:00 P.M.—*Final Session.*

1. Call to order.
2. Roll Call of Delegates.
3. Reading and Adoption of the Minutes.
4. Receipts of reports and other communications from the ASSOCIATION, the Council and the Sections.
5. Receipt of resolutions, reports and other communications all of which shall be in writing. The final report of the Committee on Resolutions will be received.
6. Unfinished Business.
7. Installation of the Chairman and Vice-Chairman of the House of Delegates.
8. Adjournment.

THE SECTIONS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

All Sections will have additions to their programs—Officers will please assist us in making the Official Program complete and correct.

SCIENTIFIC SECTION.

Officers: *Chairman*, L. W. ROWE; *First Vice-Chairman*, J. C. MUNCH; *Second Vice-Chairman*, F. J. BACON; *Secretary*, PAUL S. PITTENGER; *Delegate to the House of Delegates*, J. C. KRANTZ, JR.

Sessions: Wednesday, August 22nd, 8:00 P.M.; Thursday, August 23rd, 8:00 P.M., Joint Session with Section on Practical Pharmacy and Dispensing; Friday, August 24th, 2:30 P.M.

WEDNESDAY, AUGUST 22ND, 8:00 P.M.—*First Session.*

1. Chairman's Address, Report of Secretary, General Business.

Papers.

2. *Pharmacology and Biologic Assays.*
   "The Racial Difference of the Mydriatic Action of Ephedrine, Cocaine and Euphthalimine," K. K. Chen.
   "Stability of Homatropine Hydrobromide," Paul S. Pittenger and John C. Krantz, Jr.
   "Relative Sensitivity of Cats to Various Mydriatics and Miotics," J. C. Munch and H. L. Bunn.
   "Mydriatic Potency of Ephedrine and Its Salts," J. C. Munch.
   "Influence of Potential Alkalinity on the Utilization of Supplementary Calcium Lactate in Young Rachitic Rats," Versa V. Cole, John H. Speer and Frederick W. Heyl.
   "Influence of Potential Alkalinity on the Utilization of the Supplementary Calcium Lactate in the Mature Rat," Versa V. Cole, John H. Speer and Frederick W. Heyl.

"Sodium and Potassium Balance When Used as Citrates in Acidote and Rachitic Conditions in Rats," Versa V. Cole, John H. Speer and Frederick W. Heyl.

"A Metabolic Cage for Dogs," A. R. Bliss, Jr.

"The Toxicity of Thallium Sulphate," J. C. Munch.

3. *Botany and Pharmacognosy.*

"Medical Trees of the United States," Prof. Stuhr.

"Australian Sandalwood Oil," Edward Swallow.

"The Assay of Hydrastis Canadensis," H. A. Langenhan and R. Hirose.

4. *Bacteriology.*

"A Study of the Germicidal Efficiency of Silver Protein Mild and Silver Protein Strong, U. S. P.," K. F. Ehmann.

"An Application of Statistical Methods to Data of the Phenol Coefficients," Lloyd K. Riggs.

"A Convenient Method for the Estimation of the Hydrogen-Ion Concentration of Certain Bacteriological Media," Lloyd K. Riggs and Lyman D. Fonda.

Joint Session Scientific Section and Section on Practical Pharmacy and Dispensing.

THURSDAY, AUGUST 23RD, 8:00 P.M.

"Studies on Synthetic Ephedrine," K. K. Chen.

Report on U. S. Pharmacopœia, E. Fullerton Cook.

Report on National Formulary, Wilbur L. Scoville.

"Some Notes on the Assay Method of the U. S. P. X," T. F. Pappe.

Report of Committee on Ebert Prize, John C. Krantz, Jr.

"Ultra-Violet Radiations and Their Uses in the Pharmaceutical Laboratory," Curt P. Wimmer.

FRIDAY, AUGUST 24TH, 2:30 P.M.—*Second Session.*

5. *Chemistry.*

"The Chemistry of the Agrumans with Special Reference to that of Sweet Orange Peel," M. B. Matlack and Edward Kremers.

"The Action of Nitrosyl Chloride on Pentadecane," P. A. Foote and Edward Kremers.

"The Action of Nitrosyl Chloride on 2,2,4-Trimethyl Pentane," P. A. Foote and Edward Kremers.

"Syrup of Ferrous Iodide," H. V. Arny, Benjamin Vener and Leslie Jayne.

"A Time Saving Method for Using the Doremus Urea Nitrogen Determination Apparatus," Leah G. Goeckel.

"A Simple Method to Determine the Total Volume of Urine Voided in Twenty-Four Hours from a Fractional Specimen," Henry J. Goeckel.

"Tests for Lactic Acid," H. V. Arny and Marguerite Dimler.

"The Color and Ash Requirement for Resin of Podophyllum," L. D. Havenhill.

"Effect of Changes of Hydrogen-Ion Concentration upon Inverted Emulsions," J. C. Krantz, Jr. and Neil E. Gordon.

"Arabic Acid and Some of Its Salts as Emulsifying Agents," J. C. Krantz, Jr. and Neil E. Gordon.

"The Buffer Capacity of Acacia and Tragacanth," J. C. Krantz, Jr.

"Generalities of Solution," John U. Lloyd.

"Organic Addition Compounds of Calcium Chloride and Calcium Iodide," Frederick R. Greenbaum.

6. Nomination of Officers.
7. Reports of Committees.
8. New Business.
9. Unfinished Business.
10. Election and Installation of Officers.
11. Adjournment.

Joint Session with Scientific Section and Section on Practical Pharmacy and Dispensing.

Session: Thursday, August 23rd, 8:00 P.M.

For Program—See Program of Scientific Section.

SECTION ON PRACTICAL PHARMACY AND DISPENSING.

(Pharmacopœias, Formularies and Standards.)

Officers: *Chairman,* ADLEY B. NICHOLS; *First Vice-Chairman,* L. M. MONELL; *Second Vice-Chairman,* W. J. HUSA; *Secretary,* A. L. I. WINNE; *Delegate to House of Delegates,* C. M. SNOW.

Sessions: Thursday, August 23rd, 9:00 A.M.; Thursday, August 23rd, 8:00 P.M., Joint Session with the Scientific Section; Friday, August 24th, 2:30 P.M.

THURSDAY, AUGUST 23RD, 9:00 A.M.—*First Session.*

1. Chairman's Address, Adley B. Nichols.
2. Secretary's Report, P. H. Dirstine.
3. General Business.
4. Papers.
   - "Specific Gravities of Five Official Syrups," W. G. Crocket and J. E. Jarret.
   - "Pharmaceutical Manufacturing and Its Relationship to the Drug Store," Edward D. Davy.
   - "Why Should a Pharmacist Do Any Manufacturing?" Leon A. Thompson.
   - "More Pharmacists Are Resuming Manufacturing and Dispensing," Frederick J. Wulling.
   - "The Chlorine Productivity of Mixtures of Potassium Chlorate and Tincture of Ferric Chloride," Bertha L. DeG. Peacock and Josiah C. Peacock.
   - "Liquid Petrolatum as a Pharmaceutical Vehicle," H. C. Newton.
   - "The Assay of Syrup of Calcium Iodide," Dr. Langenhan and C. J. Braford.
   - "Synonyms, A Valuable Asset to the Practical Pharmacy," Otto Raubenheimer.
   - "The Incompatability of Sodium Salicylate and Sodium Bicarbonate," John C. Krantz, Jr.
   - "Notes on the Assay and Processes of Sodium Nitrite," Edward D. Davy.
   - "High Class Pharmacy," J. Leon Lascoff.
5. Appointment of Committees.

FRIDAY, AUGUST 24TH, 2:30 P.M.—*Second Session.*

6. Papers.
   - "The Slot Machine Druggist," H. V. Arny.
   - "An Interesting Emulsion," Wilbur L. Scoville.
   - "The Effect of Heat on the Viscosity of Mucilage of Tragacanth," L. F. Gabel.
   - "The Assay of Compound Solution of Hydrastine," H. A. Langenhan.
   - Title to be submitted, R. J. Ruth.
   - "An Improvised Nitrometer for the Assay of Spirit of Nitrous Ether," C. L. Cox.
   - "Decomposition of Hypochlorite Solutions," H. A. Langenhan and R. C. Cain.
   - "Three Unusual Prescription Formulas," Ralph E. Terry.
7. Unfinished Business.
8. Reports of Standing Committee.
9. Report of Nominating Committee.
10. Election and Installation of Officers.
11. Adjournment.

Order of program subject to change.

SECTION ON EDUCATION AND LEGISLATION.

Officers: *Chairman*, M. N. FORD; *Vice-Chairman*, W. J. HUSA; *Secretary*, A. L. I. WINNE; *Delegate to House of Delegates*, R. H. RAABE; *Alternate Delegate*, J. J. GRASSER.

Sessions: Thursday, August 23rd, 9:00 A.M.; Friday, August 24th, 2:30 P.M.

PROGRAM.

THURSDAY, AUGUST 23rd, 9:00 A.M.—*First Session.*

1. Chairman's Address, M. N. Ford.
2. Secretary's Report, A. L. I. Winne.
3. Appointment of Committees.
   - "Graduate Education in Pharmacy," Glenn L. Jenkins.
   - "Common Sense and Drug Store Practice," Edward Kremers.
   - "The Ratio of Drug Stores to Population," Edward Kremers.
   - Title of paper to be announced, Arthur G. Hulett.
   - "Pharmacy for Pharmacists Only," Lucius L. Walton.
   - "Professors of Pharmacy," Wortley F. Rudd.
   - Title of paper to be announced, Robert L. Swain.
   - "The Desirability and the Absolute Necessity of Providing Some Type of Directed Practical Experience in Our Colleges for the Undergraduate Student of Pharmacy," Rufus A. Lyman.

FRIDAY, AUGUST 24th, 2:30 P.M.—*Second Session.*

- "Ground Work for Legislation," B. M. Keene.
- "Educational Standards for Teachers of Pharmacy," B. V. Christensen.
- "Drug Store Experience and Its Educational Value," Horatio C. Wood.
- "Some Desired Legislation," H. C. Christensen.
- "Is the Pharmacy Student Receiving a Square Deal?" Robert P. Fischelis.
- "Pharmacognosy, Its Cultural and Commercial Value to the Pharmacy Students," O. P. M. Canis.

"Business and Professional Ethics," E. C. Callaway.
Reports of Committees.
Unfinished Business.
Election of Officers.
Adjournment.

SECTION ON COMMERCIAL INTERESTS.

Officers: *Chairman*, C. LEONARD O'CONNELL; *Vice-Chairman*, DENNY BRANN; *Secretary*, R. B. ROTHROCK; *Delegate to the House of Delegates*, B. M. KEENE.

Sessions: Wednesday, August 22nd, 9:00 P.M.; Thursday, August 23rd, 9:00 P.M.

WEDNESDAY, AUGUST 22nd, 9:00 P.M.—*First Session.*

Chairman's Address, C. Leonard O'Connell.
Report of Secretary, R. B. Rothrock.
Appointment of Committees.
Reports of Committees.
General Business.
"The Pharmacist as a Professional and Commercial Man," Harold W. Hutchins.
"Some Observations on Packaged Household Drugs," Bernard F. Daubert.
"Some Commercial Aspects of Ethical Professional Pharmacy," Frank T. Weber.
"Some Suggestions for Simplifications of Seltzer's Procedure in Prescription Pricing," Leonard A. Seltzer.
"Medicines of Identified Properties—After Price Maintenance, What?" Louis Emanuel.
Title to be announced, P. Henry Utech.

THURSDAY, AUGUST 23rd, 9:00 P.M.—*Second Session.*

"Modern Drug Store Salesmanship," Franklin R. Caul.
"Peregrinations of Pharmaceutical Products," Robert J. Ruth.
Title to be announced, John Funk.
Title to be announced, J. C. Stouffer.
"Insurance," Daniel O. Wolff.
Unfinished Business.
Report of Delegate, B. M. Keene.
Report of Nominating Committee.
Election of Officers.
Installation of Officers.
Adjournment.

SECTION ON HISTORICAL PHARMACY.

Officers: *Chairman*, W. P. PORTERFIELD; *Secretary*, AMBROSE MUELLER; *Delegate to the House of Delegates*, CHARLES GIETNER; *Historian*, E. G. EBERLE.

Sessions: Wednesday, August 22nd, 9:00 P.M.; Thursday, August 23rd, at 9:00 A.M.

PROGRAM.

WEDNESDAY, AUGUST 22nd, 9:00 P.M.—*First Session.*

1. Chairman's Address, W. P. Porterfield.
2. Secretary's Report, Ambrose Mueller.
3. Historian's Report, E. G. Eberle.

Papers.

Editor's Report of Progress, History of American Pharmacy, Clyde L. Eddy.
"Coca Eaters of Colombia," Illustrated Lecture, J. T. Lloyd.
"An Italian Apothecary of the 14th Century," Illustrated, Edward Kremers.
"Pharmacists and the *Scientia Amabilis*, No. 3, Flueckigeria gen. nov.," Edward Kremers.
"Historically Mindedness and a Few Suggestions," Frederick J. Wulling.
"A Plea for Veteran Druggists' Associations," Otto Raubenheimer.
"Licorice Old and New," George D. Beal, Harold T. Lacey.

4. Report of Committees.
5. Election of Officers.

THURSDAY, AUGUST 23rd, 9:00 A.M.—*Second Session.*

Papers.

"The Old Drug Store of Catskill," W. L. DuBois.
"The Pharmacy (1752) of Simon Rau & Co., Bethlehem, Pa.," Albert G. Rau.
"The Louis Hebert Monument," Josiah C. and Bertha L. DeG. Peacock.
"History of Pharmacy—A Valuable Asset to the Pharmacist," Otto Raubenheimer.
"Friedrich Woehler and the Centenary of Synthesis," Otto Raubenheimer.
Brief Address by Dr. James A. Spalding, Grandson of Dr. Lyman Spalding, "Father of U. S. Pharmacopœia."
"Drug Clerks a Hundred Years Ago," F. B. Kilmer.

"Resumé of the Early History of Missouri Pharmaceutical Association," Ambrose Mueller.

"The Former Presidents and Honorary Presidents Who Passed Since Last Meeting," E. G. Eberle.

THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY.

TWENTY-NINTH ANNUAL MEETING.

Officers: *President*, EDWARD SPEASE; *Vice-President*, H. M. FASER; *Secretary-Treasurer*, ZADA M. COOPER; *Chairman*, Executive Committee, CHARLES B. JORDAN.

MONDAY, AUGUST 20th, 9:00 A.M.

Meeting of Executive Committee.

TEACHERS' CONFERENCES.

CHEMISTRY SECTION.

Officers: *Chairman*, TOWNES R. LEIGH; *Secretary*, NELLIA A. WAKEMAN.

1. "The Teaching of Inorganic Pharmaceutical Chemistry," Edward Kremers. Discussions by C. B. Jordan, W. F. Rudd, F. P. Stroup.
2. "The Teaching of Organic Pharmaceutical Chemistry," Discussions by A. G. DuMez and Hugh C. Muldoon.

PHARMACEUTICAL SECTION.

Officers: *Chairman*, WM. F. GIDLEY; *Secretary*, ADLEY B. NICHOLS.

SECTION ON COMMERCIAL PHARMACY.

Officers: *Chairman*, JOHN G. BEARD; *Secretary*, CHARLES H. STOCKING.

"What Text-Books Are Necessary to Teach Commercial Pharmacy?" Charles O. Lee and John G. Beard.

MATERIA MEDICA SECTION.

Officers: *Chairman*, L. K. DARBAKER; *Secretary*, HEBER W. YOUNGKEN.

"The Teaching of Bacteriology," Albert Schneider.

"The Teaching of Physiology," A. Richard Bliss.

"The Teaching of Biological Assaying," Paul S. Pittenger.

"The Teaching of Pharmacodynamics,"

MONDAY, AUGUST 20th, 2:00 P.M.

First Session of Association.

1. Roll Call.
   Memorial to Prof. Hemm, C. E. Caspari.
2. President's Address, Edward Spease.
3. Report of Secretary-Treasurer, Zada M. Cooper.
4. Report of Executive Committee, C. B. Jordan.
5. Appointment of Nominating Committee.

Reports of Standing Committees.

6. "Higher Educational Standards," E. H. Kraus.
7. "Curriculum and Teaching Methods," R. H. Raabe.
8. "Activities of Students and Alumni," E. R. Serles.

MONDAY, AUGUST 20th, 6:00 P.M.

Annual Dinner.

Address by Dr. Robert C. Givler, Prof. of Psychology, Tufts College.

MONDAY, AUGUST 20th, 8:30 P.M.

Second Session of Association.

9. Committee on Investigation of Pharmacy Schools by Carnegie Foundation, W. F. Rudd.
10. Consideration of Investigation of Pharmacy and Pharmaceutical Education in Conjunction with N. A. B. P.

Reports of Special Committees.

11. Curriculum, C. W. Johnson.
12. Professors for Research, Arno Viehoever.
13. Relation of Boards with Colleges, Zada M. Cooper.

(Reports of District Meetings.)

Meeting of Executive Committee following this Session.

TENTATIVE PROGRAM.

Joint Session of the National Association Boards of Pharmacy and the American Association of Colleges of Pharmacy.

Report of the Fairchild Scholarship Committee, E. G. Eberle.

The Examination for the Fairchild Scholarship: "What Subjects Shall Be Included and Who Shall Be Eligible for the Award?" E. G. Eberle.

Report of the Advisory Committee on the Survey of Colleges of Pharmacy.

Note. If time permits opportunity will be given for discussion of other topics.

TUESDAY, AUGUST 21st, 2:30 P.M.

Last Session of Association.

Reports of Representatives and Delegates.

14. Drug Trade Bureau, W. F. Rudd.
15. Biological Abstracts, H. W. Youngken.
16. National Conference on Pharmaceutical Research, W. H. Zeigler.
17. Druggist Research Bureau, A. W. Pauley.
18. National Drug Trade Conference, E. F. Cook.
19. National Association of Retail Druggists, L. D. Havenhill.
20. Unfinished Business.
21. Miscellaneous Business.
22. Election of Officers.
23. New Business.

Executive Session.

NATIONAL ASSOCIATION OF BOARDS OF PHARMACY.

TWENTY-FOURTH CONVENTION AT EASTLAND HOTEL.

Officers: *President*, A. C. TAYLOR, Washington, D. C.; *Secretary*, H. C. CHRISTENSEN, Chicago, Ill.

All meetings of the National Association Boards of Pharmacy will be held in Eastland Hotel.

PROGRAM.

MONDAY, AUGUST 20th, 9:00 A.M.—*First Session.*

1. Call to order, President A. C. Taylor.
2. Roll call.
3. Appointment of Committee on Credentials.
4. President's Address, A. C. Taylor.
5. Appointment of Committee on President's Address.
7. Report of the Secretary, H. C. Christensen.
8. Report of the Treasurer, J. W. Gayle.
9. Report of Committee on Constitution and By-Laws.

MONDAY, AUGUST 20th 2:00 P.M.—*Second Session.*

1. Report of Legislative Committee.
2. Report of Committee on Credentials.
3. Appointment of Nominating Committee.
4. Report of Advisory Examination Committee.
5. Report of Syllabus Committee.
6. Report of Special Committee on Federal Legislation.
7. Report of Committee on Drug Store Ownership Law.
8. Verbal Report of Vice-Presidents:

District No. 1	District No. 5
District No. 2	District No. 6
District No. 3	District No. 7
District No. 4	District No. 8

District No. 9

9. Appointment of Resolutions Committee.

Extra Session, Monday, August 20th, at 8:00 P.M., if deemed necessary.

TUESDAY, AUGUST 21st, AT 9:00 A.M.—*Third Session.*

Joint Session—National Association Boards of Pharmacy and American Association of Colleges of Pharmacy.

PROGRAM.

See under American Association of Colleges of Pharmacy.

TUESDAY, AUGUST 21st, AT 2:30 P.M.—*Fourth Session.*

1. Report of Committee on President's Address.
2. Report of Advisory Publicity Committee.
3. Report of N. A. B. P. Committee on Prerequisite Legislation.
4. Report—Committee on Standards and Requirements for Classification of Colleges of Pharmacy.
5. Report of Committee on National Certificate.
6. Report of Grievance Committee.
7. Report of Special Committees.
8. Unfinished Business.
9. New Business.
10. Report of Nominating Committee.
11. Election and Installation of Officers.

NATIONAL CONFERENCE ON PHARMACEUTICAL RESEARCH.

The seventh annual meeting of the National Conference on Pharmaceutical Research will be held in Eastland Hotel, Portland, Me., on Saturday, August 18, 1928.

Officers: *Chairman*, H. V. ARNY; *Vice-Chairman*, E. FULLERTON COOK; *Secretary-Treasurer*, JOHN C. KRANTZ, JR.

There will be two sessions of the Conference, one beginning at 9:30 A.M. and the other at 2:00 P.M.

The tentative program is as follows:

1. Roll Call.
2. Report of Officers.
3. Reports of the thirteen standing committees.
4. Report of special committee on color standards.
5. Report of special committee on book of research achievements.
6. Report of the special committee on ways and means and on expansion.
7. Reports and greetings from delegates from the affiliated organizations, *viz.:*
   - (*a*) Association of Official Agricultural Chemists.
   - (*b*) American Association of Colleges of Pharmacy.
   - (*c*) American Drug Manufacturers Association.
   - (*d*) AMERICAN PHARMACEUTICAL ASSOCIATION.
   - (*e*) American Pharmaceutical Manufacturers' Association.
   - (*f*) Bureau of Chemistry, U. S. Department of Agriculture.
   - (*g*) Hygienic Laboratory, U. S. Public Health Service.
   - (*h*) National Association Boards of Pharmacy.
   - (*i*) National Association of Retail Druggists.
   - (*j*) National Formulary Revision Committee.
   - (*k*) National Wholesale Druggists Association.
   - (*l*) Pharmaceutical Laboratory Seminar.
   - (*m*) Plant Science Seminar.
   - (*n*) Proprietary Association.
   - (*o*) U. S. P. Revision Committee.
8. Reports on and discussion of:
   - (*a*) Census of Research.
   - (*b*) Graduate students in pharmacy and their research work.
   - (*c*) Research grants and prizes.
   - (*d*) Research fellowships and scholarships.
9. New Business.
10. Election.
11. Adjournment.

Purchase your tickets on the Certificate Plan.

CONFERENCE OF PHARMACEUTICAL ASSOCIATION SECRETARIES.

Officers: *President,* A. L. I. WINNE; *Secretary-Treasurer,* W. H. LAMONT.

Sessions: Wednesday, August 22nd, 4:30 P.M.; Thursday, August 23rd, 4:30 P.M.

WEDNESDAY, AUGUST 22ND, 4:30 P.M.—*First Session.*

President's Address, A. L. I. Winne.
Secretary-Treasurer's Report, W. H. Lamont.
Consideration of Constitution and By-Laws.
The Conduct of State Pharmaceutical Association Conventions.

THURSDAY, AUGUST 23RD, 4:30 P.M.—*Second Session.*

The distribution of information concerning State Association Progress.
Plans for increasing membership.
Appointment of Committees.
Election of Officers.

Purchase your tickets on the Certificate Plan.

PLANT SCIENCE SEMINAR.

SIXTH ANNUAL MEETING.

Massachusetts College of Pharmacy, Boston.

Officers: *Chairman,* H. W. YOUNGKEN; *Secretary-Treasurer,* O. P. M. CANIS.

Sessions: Monday, August 13th to Thursday, August 16, 1928.

MONDAY, AUGUST 13TH.

9:30 A.M. Registration of Members.
10:00 A.M. *First session.*
Address of Welcome by Dr. Theodore J. Bradley, Dean of Massachusetts College of Pharmacy.
Chairman's Address.
Secretary's Report.
12:00 M. Luncheon.
1:30 P.M. Auto trip to Lexington and Concord and inspection of historic revolutionary shrines.
8:00 P.M. *Second Session.*
Committee Reports.
Appointment of Committee on Nominations.
Address by Dr. Herman C. Lythgoe, Chemist of the Massachusetts State Department of Health.

TUESDAY, AUGUST 14th.

9:00 A.M. *Third Session.*
Round table on Micro-Biology, Prof. L. K. Darbaker, *Leader.*
Demonstration of apparatus for determination of volatile oils, J. F. Clevenger.
"Color Nomenclature and Color Standards of the U. S. P.," with Exhibits, Prof. E. N. Gathercoal.

12:00 M. Luncheon.

1:00 P.M. Trip to the Arnold Arboretum and inspection of grounds.

8:00 P.M. *Fourth Session.*
Optical crystallographic methods (continued from last year), Geo. L. Keenan.
"Teaching Methods," with exhibits, Prof. E. H. Wirth.
"Symposium on Viburnum"—Review of work done on *V. prunifolium* and *V. cassinoides,* F. O. Taylor.
"The Comparative Chemistry of the Root Barks of *V. prunifolium* and *V. cassinoides,*" Prof. Florin J. Amrhein.
Discussion by Professors E. F. Cook, H. W. Youngken, E. N. Gathercoal and others.

WEDNESDAY, AUGUST 15th.

9:00 A.M. Visit to Agassiz Hall, Harvard University, Cambridge and inspection of glass flower collection.

1:00 P.M. Field trip by automobile to a shore section of Massachusetts. *Leaders:* Dr. Youngken, Dr. Bill, and other members of New England Botanical Club.

THURSDAY, AUGUST 16th.

9:00 A.M. *Fifth Session.*
Report on progress of census on commercial, geographical sources of American medicinal plants (auspices of National Research Council, Committee on Pharmacognosy and Pharm. Botany), Dr. W. W. Stockberger.
"On Abbreviations found in the Pharmacopœia (U. S. P. X) and National Formulary (N. F. V) II," Prof. Charles C. Plitt.
"Note on Preparing Slides of *Scilla,*" Prof. Charles C. Plitt.
Round table and demonstrations.

12:00 M. Luncheon.

1:00 P.M. Trip to Gray Herbarium and University Gardens at Cambridge. Address by Mr. Francis Lazenby, Superintendent of the gardens.

8:00 P.M. *Sixth Session.*
Business meeting.
Announcement of Delegates to National Conference of Pharmaceutical Research.
Reports of committees.
Election of officers.
Adjournment.

FRIDAY, AUGUST 17th.

Program to be announced by local committee.

In addition to the above planned program the following members will speak:

"Medicinal Plants of Florida," Prof. Christensen.
"More about Digitalis," Prof. W. J. Stonebach.
"Drug Testing," and "Soil Fertilization," Dr. A. Viehoever.
Subject to be announced later, Prof. A. Hogstadt, Jr.

HOTEL RESERVATIONS.

Hotel Helvetia, 706–712 Huntington Ave., Boston, has made the following rates: single room, $1.50 to $2.00 per day, and $6.00 to $8.00 per week; double room, $2.00 to $3.00 per day and $9.00 to $12.00 per week. There is no dining room connected with the hotel but restaurants are close by.

Make your reservations promptly and notify Chairman H. W. Youngken.

RAIL ROAD RATES.

Tickets from Boston to Portland may be purchased on the *Certificate Plan* and *it is requested that all who attend the Seminar will do so,* it will help to make up the necessary 250 tickets. Summer rate tickets can be purchased to Boston. Please assist in making up the quota of certificate tickets, as suggested.

A **Symposium on the Genus Mentha** will be held at Eastland Hotel, Portland, during week of August 20th.

The **Kappa Psi Fraternity** will hold its annual meeting in Eastland Hotel, on Friday and Saturday, August 17th and 18th.

INDIANA SCHOOLS FAVOR MINIMUM FOUR-YEAR COURSE IN 1930.

Dean C. B. Jordan reports that on April 11, 1928, there met in Indianapolis representatives of the Indiana Colleges of Pharmacy and the Board of Pharmacy of Indiana. There was presented at this session the question of when the Indiana Colleges of Pharmacy should eliminate the shorter three-year course and offer as a minimum a four-year course. After discussion, this group voted unanimously to recommend to the Indiana State Pharmaceutical Association that beginning with September 1930, no student be admitted to a course shorter than four years in any college of pharmacy in Indiana. On June 21st, this resolution was presented to the Indiana State Pharmaceutical Association and unanimously adopted. This means that the following colleges of pharmacy will eliminate the shorter three-year course beginning in September 1930: Purdue University, School of Pharmacy; Valparaiso University, School of Pharmacy and Indianapolis College of Pharmacy. It should be noted that the University of Notre Dame, School of Pharmacy eliminated their shorter course some time ago and are offering a four-year course as a minimum.

OFFICERS OF AMERICAN MANUFACTURERS OF TOILET ARTICLES.

At the annual meeting of the American Manufacturers of Toilet Articles, held at Atlantic City, the following officers were elected: *President*, John A. Handy, Buffalo, N. Y.; *First Vice-President*, H. H. Bertram, New York; *Second Vice-President*, V. C. Daggett, New York; *Secretary-Treasurer*, Daniel J. Mulster, New York.

INTERNATIONAL CONGRESS OF ENTOMOLOGISTS.

The ravages of insects, estimated at a loss of over two billion dollars annually in the United States alone, will be studied comprehensively by world scientists when the fourth international congress of entomology meets at Cornell University from Aug. 12th to 18th. Leading entomologists of the world, including over 100 foreign delegates, have registered.

Dr. L. O. Howard, senior entomologist of the Department of Agriculture in speaking of the importance of this work said: "Few people realize the critical situation which exists at the present time. Men and nations have always struggled among themselves. War has seemed to be a necessity growing out of the ambition of the human race. But there is a war between all humanity and certain forces that are arrayed against it, the bacteria and protozoa that carry disease and the enormous forces of injurious insects which attack us from every point and which constitute to-day our greatest rivals in the control of nature."

NEW YORK PHARMACEUTICAL SOCIETY ANNUAL MEETING.

At the annual meeting of the New York Pharmaceutical Society recently held in the Empire Hotel, New York, the following officers were elected for the ensuing year: *President*, P. M. Everts; *First Vice-President*, R. R. Gerstner; *Second Vice-President*, A. J. Bauer; *Third Vice-President*, Henry Brenwasser; *Secretary*, R. S. O'Brien; *Treasurer*, J. E. Thomas.

OFFICERS OF GLASS CONTAINER ASSOCIATION.

At the annual meeting of the Glass Container Association held in Atlantic City during the week of May 14th, the following officers were elected for the coming year:

President, P. I. Heuisler, Baltimore; *First Vice-President*, W. H. McClure, Wheeling; W. Va.; *Second Vice-President*, H. C. Mandeville, Elmira, N. Y.; *Secretary-Treasurer*, R. E. Walker, Terre Haute, Ind.

OFFICERS OF STATE PHARMACEUTICAL ASSOCIATIONS, 1927–1928.

Secretaries of Associations are respectfully asked to make corrections, and send in lists of officers and names of next convention cities to the JOURNAL of the AMERICAN PHARMACEUTICAL ASSOCIATION, 10 W. Chase St., Baltimore, Md.

ARKANSAS.

M. D. Daggett of Mariana has been elected President of the Arkansas Pharmaceutical Association; Miss Mary A. Fein was reëlected Secretary.

CALIFORNIA.

Secretary E. F. Kelly reported a most successful meeting with about 300 in attendance. The Association favored the Capper-Kelly Bill and an Ownership law. Secretary Kelly was one of the speakers. The array of speakers and number of papers evidenced a most interesting

convention. The papers dealt with professional and business subjects. Among those participating were W. Bruce Philip, L. N. Brunswig, A. R. Heron, M. P. Hoodenpyl, Jr., George M. Wessells, A. H. Vossmeyer, H. F. Stevens, D. D. Wray, W. J. Leedke, Ora E. Monette. Window display, advertising, stock adjustment, financial studies vied with science and art of pharmacy. Variety of entertainments added to the pleasures, a banquet, dance and dinner in Mexico were some of the features.

The following officers were elected for the ensuing year:

President, George H. Frates, San Francisco.
First Vice-President, A. H. Vossmeyer, Los Angeles.
Second Vice-President, Marvin Sydensticker, Sacramento.
Third Vice-President, D. D. Wray, San Diego.
Secretary, T. W. Jones, Los Angeles.
Treasurer, Harvey Henry, Los Angeles.
Place of 1929 meeting, Eureka.

CONNECTICUT.

Among the speakers of the meeting held in New London were Curtis P. Gladding and C. E. Gilbert.

The following officers were elected for the ensuing year:

President, Louis Montanaro, New Haven.
First Vice-President, J. E. F. Jones, Bridgeport.
Second Vice-President, P. B. Randall, Watertown.
Secretary-Treasurer, P. J. Garvin.

IDAHO.

Idaho Association passed resolutions favoring the Capper-Kelly Bill, restricting sales to druggists, a measure which provides that part of the registration fee will go to the State Association, for representation in the Conference of Pharmaceutical Secretaries, an ownership law, patterned after the Pennsylvania law, providing medals for past-presidents and opposed special legislation which taxes drug store merchandise.

Among the speakers were Secretary E. F. Kelly of the A. PH. A. and F. R. Peterson of the N. A. R. D.

The following officers were elected for the ensuing year.

President, H. F. Fitzpatrick, Twin Falls.
First Vice-President, A. A. Walker, Boise.
Second Vice-President, Horace B. Whittlesey, Pocatello.
Secretary, H. M. Cummins, Melba.
Treasurer, Orville Jackson, Eagle.

Lewiston was chosen for the 1929 meeting place.

MAINE.

The interest of the Maine meeting was enhanced because of the prospective A. PH. A. meeting. Governor Ralph O. Brewster and Congressman C. L. Beede were speakers at the banquet. Prof. Theodore J. Bradley spoke for the A. PH. A. and J. F. Finneran for the N. A. R. D. About 300 were present at the banquet presided over by J. H. Dow, *Chairman* of the Entertainment Committee for the A. PH. A.

The following officers were elected for the ensuing year:

President, Charles S. Pierce, Sanford.
First Vice-President, Francis F. Frawley, Bangor.
Second Vice-President, Lewis O. Barrows, Newport.
Third Vice-President, Roy M. Hiscock, Monson.
Secretary, James H. Allen, Waterville.
Treasurer, Dr. M. L. Porter, Danforth.

MARYLAND.

Maryland pharmacists can always be depended upon in support of the Pharmacy School. The report by Chairman R. E. Lee Williamson commented on the building program of the School and urged an annual maintenance provision by the State of 20,000. Dean DuMez was the Chairman of the Committee on Resolutions. An excellent Scientific Program was carried out under the chairmanship of Dr. J. C. Krantz, Jr. Among the speakers at the banquet were Dr. R. H. Riley, of the State Board of Health and Paul Pearson of Washington, D. C. Secretary Kelly was missed, but Secretary *pro tem* Strassburger aided by Editor R. L. Swain carried on the work. Dr. S. L. Hilton and E. G. Eberle represented the A. PH. A. Clyde L. Eddy was one of the speakers of the convention.

The following officers were elected for the ensuing year:

President, Harold W. Allen, Baltimore.
First Vice-President, George J. Colborn, Princess Anne.
Second Vice-President, L. F. Williams, Baltimore.

Third Vice-President, W. B. Spire, Mount Rainier.

Secretary, E. F. Kelly, Baltimore.

Treasurer, G. P. Hetz, Baltimore.

MASSACHUSETTS.

Former presidents of the Association were presented with badges of office. A number of interesting papers and addresses added to the program of the convention; among the contributors were Hon. J. P. Cavanagh, Clyde L. Eddy, H. Henry, J. F. Finneran, Dr. Heber W. Youngken. The banquet was attended by about 500, and presided over by Toastmaster Finneran; among the speakers of the banquet were Sewall Cutter, President Harring and Hon. Wm. J. Foley.

The following officers were elected for the ensuing year:

President, P. J. Cuddyer, South Boston.

First Vice-President, B. Alteri, Springfield.

Second Vice-President, T. Willard Burke, Lynn.

Secretary, James F. Guerin, Worcester.

Treasurer, Lyman W. Griffin, Allston.

MISSOURI.

President Pauley recommended important changes in the organization of the Association; among his recommendations were—the appointment of a Development Committee to plan the work of the Association for the next five years—provision for a Committee to outline a plan for Commercial Instruction in buying, selling, advertising, management, etc. Secretary Lamont presented an interesting report on the activities of the Association. A banquet was a feature of the convention, at which five Charter Members were honored, Messrs. Overstreet, Clifford, Franklin, Hoffman and Churchill. Treasurer William Mittelbach presided as toastmaster. Among the speakers of the convention were E. C. Brokmeyer, Judge H. S. Caulfield, Frank H. Weilandy and Senator A. H. McCauley; many interesting papers were read.

The following were elected officers for the ensuing year:

President, M. Q. Williams, Warrensburg.

First Vice-President, C. W. Hutchason, Kansas City.

Second Vice-President, H. R. Speckhart, St. Louis.

Third Vice-President, H. T. Simpson, Caruthersville.

Treasurer, William Mittelbach, Boonville.

Secretary, W. H. Lamont, St. Louis.

Assistant Secretary, B. H. Taylor, Columbia.

Honorary President, Wm. E. Bard, Sedalia.

Historian, Ambrose Mueller, Webster Grove.

Council Members: Messrs. Pauley, Spaeth, Pierce, Shuler, Rosse, Schroers.

The resolutions adopted favored Chain Store investigation and congratulated the U. S. Senate for its action in that connection; congratulating the N. A. R. D. for its successful efforts in reducing taxes, the Capper-Kelly Bill, thanking Senator Hawes for his support of foregoing measures.

Secretary Lamont writes:

"At our last meeting, the Fiftieth Annual Convention of the M. P. A., held in Sedalia, June 19th–22nd, the Missouri Pharmaceutical Association went on record with a plan to discontinue solicitation of merchandise for prizes and cash to defray the cost of their meeting. This, to my mind, is one of the greatest advances in state pharmaceutical conventions made in the last twenty-five years. The writer presented the idea to the members assembled and one of our life members made a motion to have the recommendation acted upon and, unless our plans miscarry, the next meeting of our Association will be conducted without any outside help."

NEW JERSEY.

A total of 433 members and guests were registered at the New Jersey Meeting held in Atlantic City.

Men of National prominence, who were among the guests and speakers at the various sessions included Eugene C. Brokmeyer, General Counsel and Washington Representative of the N. A. R. D., Murray Breese, Editor of the *American Druggist*, J. C. Peacock, of Philadelphia, Dean Charles H. LaWall, of Philadelphia, Dean Hugh C. Muldoon, of Pittsburgh, Dean Fraser Metzger, of Rutgers University, Dr. J. Ruth of New York, Dr. S. L. Hilton of Washington and Dean J. W. Sturmer, of Philadelphia.

Favorable action was voted on Capper-Kelly Bill, next annual meeting will be held in Asbury Park, for a full week; annual dues are increased to $7.00, next annual meeting of N. A. R. D. in Atlantic City. W. M. Littel, the only living Charter Member of the Association was present, 83 years of age, and elected a Life Member.

The following were elected officers for the ensuing year:

President, Louis C. Arnold, Newark.

First Vice-President, Charles Brown, Atlantic City.

Second Vice-President, P. H. Jackson, Wildwood.

Secretary, Robert P. Fischelis, Trenton.

Treasurer, Charles McCloskey, Branchville.

The address of President Fred W. Warnke was comprehensive and detailed the activities of the year. He acknowledged the assistance given him by the officers and specifically complimented the Secretary for his services and for coming to the assistance of the Association after the death of the former Secretary, Jeannot Hostmann. All of the recommendations of the President were adopted.

EDITOR'S NOTE.—*Owing to the various reports that must be published in this issue, the reports of other Associations must be deferred.*

PHARMACY WEEK PLANS.

A meeting was held at the Drug and Chemical Club in New York City, June 8th, for the discussion of plans for the Pharmacy Week of 1928, October 14th–20th.

Among those present were Dr. Frederick B. Kilmer, of New Brunswick, N. J., a member of the Executive Committee on Pharmacy Week; Dr. Robert J. Ruth, National Chairman, and Dr. E. L. Newcomb, Secretary of the National Wholesale Druggists Association. Editor E. B. Dyer, of the *Practical Druggist;* Editor Murray Breese, of the *American Druggist;* Editor Jerry McQuade, of *Drug Topics;* Associate Editor Harold W. Hutchins, of the *Druggists Circular;* R. B. Whittlesey, of New Haven, Conn., Vice-Chairman of the Committee on Education and Research of the N. A. R. D.; Edwin Sater, Assistant Publicity Director of the A. PH. A. Headquarters; R. A. Porter of the Dorland Advertising Agency and Leo Einson-Freeman Company, Lithographers.

The National Executive committee on Pharmacy Week is composed of the following members: National Association of Retail Druggists, C. Fred Wright, Boston, Mass., *Chairman;* A. V. Burdine, Washington, D. C.; John C. Culley, Ogden, Utah; P. J. Kolb, Chicago, Ill.; Joseph W. Noble, Philadelphia, Pa.; AMERICAN PHARMACEUTICAL ASSOCIATION; Robert J. Ruth, New York City, *Chairman;* Frederick B. Kilmer, New Brunswick, N. J.; William B. Day, Chicago, Ill.; W. Bruce Philip, San Francisco, Calif.; Hal E. Duncan, Birmingham, Ala.

Robert J. Ruth has again been chosen to head the movement as Chairman of the Joint Committee which comprises the Executive Committee. The Presidents and Secretaries of each Pharmaceutical Association will be asked to act as a Special Committee.

Dr. Newcomb and Mr. Whittlesey presented the tentative plans of the N. W. D. A. for participation in the 1928 campaign. This coöperation will be invaluable to the success of the movement and those present were enthusiastic in expressing their approval of the plans which have thus far been drafted.

The issuing of a broadside to contain all helpful information pertaining to the observance was discussed. Other suggestions included the planning of inside store displays for Pharmacy Week in addition to window displays, public meetings to be addressed by men of national prominence not connected with pharmacy, the issuing of the Governor's proclamation designating the week of October 14th–20th as Pharmacy Week, public renewal of their pledge to the code of ethics and other forms of publicity.

The Editors of Pharmaceutical Journals will be made a Publicity Committee.

All present were of the opinion that Pharmacy Week should be observed in an even more dignified manner than heretofore and that all evidence of commercialism be discouraged.

MAILING POISONS.

Congress adjourned without passing the bill to allow the shipment of poisonous drugs through the mail to licensed physicians, surgeons, dentists, pharmacists, druggists and veterinarians.

This bill is advocated by the Post Office Department, which in previous years objected to the passage of a similar bill which would have permitted the mailing of insecticides and fungicides under regulations to be established by the Postmaster General.

The objectionable clause was eliminated from the bill in the hope that it might be passed, but it went over until the second session of the Seventieth Congress.

ONLY DRUGGISTS CAN SELL CANNED HEAT IN GEORGIA.

In Georgia only druggists can sell "canned heat" according to a ruling, issued May 12th, of State Attorney-General George N. Napier and Commissioner of Agriculture Eugene Talmadge. The ruling followed a campaign against the sale of solidified alcohol because of its alleged misuse by alcoholic addicts. Pharmacists must label the product "poison."

LEGAL AND LEGISLATIVE.

NARCOTICS DIVISION LISTS DRUGS EXEMPT FROM LIMITATIONS.

Certain preparations designed for external use, and which contain narcotic drugs in excess of the exemption limitations of the law, may be sold as exempt preparations within the meaning of the second paragraph of Article 103, Regulations Number Five, according to a statement issued recently by the Narcotics Division of the Prohibition Bureau.

The reason given by the Bureau for the exemption of these products is that they appear sufficiently denatured to prevent their internal administration. A list may be obtained from the Revenue Collector, however, a general statement made some time ago may be taken as indicating the present policy of the Narcotic Division of the Prohibition Bureau:

"All external preparations containing narcotics, including those for aural, nasal, ocular, rectal, urethral or vaginal purposes, fall within the exempt class irrespective of the amount of narcotic contained, provided that where a preparation contains narcotic drugs in excess of the exempted quantities in the first paragraph of Article 103, the product must contain other ingredients which render it unfit for internal administration, and provided further that the preparation is sold for medicinal purposes only, as indicated in Article 104, Regulation Number Five, and a record is kept of the sales thereof in the manner described in Article 107; it being understood, of course, that preparations containing cocaine in any amount are not exempt."

RENEW LIQUOR PERMITS IN JULY OR AUGUST.

Manufacturers in the drug trade should apply for renewal of their liquor permits some time during July or August, advised Harry B. Thompson, general counsel of the Proprietary Association, at the convention of the group held recently in New York City.

Originally, Mr. Thompson pointed out, it was understood from the regulations governing the National Prohibition Act that those making patent or proprietary medicines or other commodities unfit for beverage purposes were not to be subject to the provisions of the Act. Permits taken out by these manufacturers, therefore, were to remain in force as long as the supporting bonds required by these regulations remained in full force.

One of the United States courts, however, Mr. Thomspon told the convention, has ruled that all permits, regardless of what they are for, must be renewed annually.

In a suit to be heard shortly by the Supreme Court, this question will be finally determined. Meanwhile, until a decision is secured, manufacturers are urged to renew their permits although they are under no circumstances to surrender their old permits.—From *Drug Trade News.*

STANDARDS ON PLASTERS AND GAUZE IN EFFECT ON SEPTEMBER 1ST.

Standard sizes of adhesive plaster and surgical gauze will be put into effect on September 1, 1928, according to a bulletin just released by the Division of Simplified Practice of the Department of Commerce.

The decision to create standards of these commodities was reached on February 15th, at a meeting attended by representatives of the manufacturers, users and distributors of these products.

To put the standards into effect, however, the written acceptance of at least 80% of the hospital, medical and drug trades was necessary. This has already been obtained.

The standard sizes of these products, it is understood, are subject to annual revision or reaffirmation by the drug and allied industries.

OLD MODEL OF STEAM AUTO AT UNIVERSITY OF MARYLAND.

Surrounded by medicine bottles and specimens, an old model of a steam automobile, probably one of the first of its kind in the world, is lying on a shelf in the pharmaceutical laboratory of the University of Maryland.

Long before the automobile era a professor at the university dreamed of a power-driven carriage, and constructed a working model of his dream. To-day, the model, at least forty years old, is still in a workable condition, although one of its wheels is missing and the valve mechanism and other parts are broken and worn.

The inventor, according to A. Dorsey Johnson, cashier of the university, was the late Dr. William E. A. Aiken, professor of chemistry and pharmacy from 1838 to 1888.

Buy your tickets to Portland Me., on the Certificate Plan.

BOOK NOTICES AND REVIEWS.

Photometric Chemical Analysis. Volume 1, Colorimetry. By JOHN H. YOE, Ph.D., Professor of Chemistry, University of Virginia. 771 pages. 72 figures. John Wiley & Sons, New York. Price, cloth, $8.50.

This comprehensive volume represents the first extensive treatment of this useful branch of applied analytical chemistry. Color, as a means of making quantitative determinations, has long been in favor where speed and sensitivity were important considerations. While perhaps not as precise as gravimetric methods, it is sufficiently so to warrant its use in routine technical analysis. During the past quarter century numerous new colorimetric methods have been devised, and their sensitivity and accuracy increased. All of this material has been well correlated by the author.

The book is divided into five parts. *Part I* is a general treatment of methods, apparatus, calculations, calibration and correction curves, errors, the effects of colloids, and lastly specific directions for the use and care of a precision colorimeter. Some idea of the scope of the book can be obtained from the fact that some twenty colorimetric instruments are described in fair detail. The author might have included a description of the Buerker Colorimeter, although he does cite it in the bibliography, since it is one of the few instruments which eliminates the influence of the diluent by having the layers of liquid viewed, of constant depth throughout the determination. Tintometers and spectrophotometers are purposely omitted by the author, although they might with advantage have been included. Data concerning the latter type of instrument and its applications is widely scattered in the literature, and a future edition of this book would be well benefited by a compilation of this material.

Part II describes the determination of the inorganic elements and ions, including some of the less common ones. The method of treatment is commendable. A brief outline of the determination is followed by the list of reagents and their preparation, the details of the procedure, and valuable notes which include limitations, errors, sensitivity and precision wherever known. The original literature is cited in each instance. *Part II* also includes a single chapter on the determination of p_H, which cannot of course do complete justice to a subject to which several texts have been entirely devoted. It does, however, give a good summary of this subject. The author should have included the preparation of p_H standards rather than advocate their purchase.

Part III deals with organic determinations, including such medicinals as adrenalin, benzaldehyde, citral, formaldehyde, phenol, salicylic acid, tannin and vanillin. Undoubtedly a number of the methods included in *Parts II and III* need further investigation and perhaps some "weeding out," and it is the hope of the author that his readers will coöperate with him in this respect.

Part IV devotes some 90 pages to a thorough treatment of the colorimetric determinations of the chemical constituents of the blood and urine.

Part V, one of the outstanding features of the book, is an extensive bibliography of 184 pages. The references are listed under some 200 substances, and are especially valuable because of the short descriptions which most of them contain. An author index is also included.

The editing has been carried out in the characteristic fine style of the publishers. A few typographical errors have crept in; *viz.*—the formulas for borax on page 136, and for dimethyl glyoxime on page 248 are incorrect.

Volume I is to be followed shortly by the publication of a second volume, Nephelometry, and when completed, this treatise, both as manual and reference work, should do much toward bringing this subject into greater vogue among analysts not yet familiar with its advantages.

A. TAUB.

Troubles We Don't Talk About. By J. F. MONTAGUE, M.D. J. B. Lippincott Co., Publishers. Price $2.00.

This book is written for the information and guidance of the public and deals with afflictions of the rectum such as hemorrhoids, fissure, fistula, stricture, loss of bowel control and cancer. A short description of each ailment is given in terms which are readily understood by the layman.

Emphasis is laid upon the seriousness of rectal troubles and those who "suffer in silence" are urged to discard their false modesty and seek immediate examination by a competent rectal specialist. The author states that practically all operations can be performed without the use of a general anæsthetic, without pain and with little or no loss of time on the part of the patient.

General practitioners who prescribe ointments and suppositories, after little or no examination, are scored. A thorough examination by a specialist, who is equipped with special instruments for this work and who has made a study of these conditions, is advocated.

The author deprecates the use of suppositories and ointments because they do not cure, but cause temporary relief and in this way give the patient a false feeling of security, while the condition grows steadily worse. Sciatica, lumbago, stomach trouble and other ailments are said to have disappeared, after troubles of the rectum have been cured. Laxatives are discussed. Some are recommended, others are condemned.

This book is both interesting and informative. Those who "suffer in silence" should not fail to read it. It will impress them with the seriousness of neglect and the folly of self-medication. Furthermore, it commends itself to careful reading by the pharmacist. Its teachings will undoubtedly convince him that his greatest service lies in advising such cases to consult competent medical authorities, rather than use preparations which are advertised so widely for the treatment of these conditions. W. G. CROCKETT.

Anthelmintics and Their Uses in Medical and Veterinary Practice. By R. N. CHOPRA, M.A., M.D. (Cantab), Professor of Pharmacology, Calcutta School of Tropical Medicine and Hygiene and Asa C. Chandler, M.Sc., Ph.D., Professor of Biology Rice Institute, Houston, Texas. Pages 291. Baltimore: The Williams and Wilkins Company, 1928. Price $5.00.

Contributions of a most useful and practical type have been made to Medical, Veterinary and Pharmacological literature in this monograph. The authors have presented the subject matter under three main headings.

Section I.—General Consideration.

Section II.—Anthelmintics Acting on Parasites in the Gut.

Section III.—Anthelmintic Used Against Somatic Parasitic Infection.

They have collected into one volume the widely scattered data on a subject which is at once of immense importance to any one interested in helminthology. The data are given in a concise and sufficiently detailed manner to be useful not only as a reference book, but equally in daily routine practice.

The style of presentation is particularly happy, in that the detailed knowledge so necessary to successful practice in this field of therapy is supplemented by a sufficient amount of historical data to add zest to the volume, making it a most readable monograph.

A complete bibliography of more than 500 references is a very useful addition to the book. The volume should have a popular appeal to physicians, veterinarians, research workers and pharmacologists. WM. B. P.

Recent Advances in Biochemistry. By John Pryde, 2nd edition. 379 pages. Price, $3.50. Publishers, P. Blakiston's Son & Co., Phila. This is a revision of the original edition which was published in 1926. That the original edition was well received is evident from the fact that it has already been completely sold out. The arrangement of material in the new edition does not differ materially from that in the original edition except that a new chapter, Chapter IV, has been added dealing with the recent work of Harrington on the chemistry of thyroxine and of Raper and his associates on the formation of melanin from tyrosine through the action of the enzyme tyrosinase. Harrington's method for preparing thyroxine from the thyroid gland and the experimental evidence by which he proved its structure are given in considerable detail. A brief outline of its methods of synthesis is also given. Chapters I, II, III, VI, VIII and XI, dealing with protein catabolism; colloids and the physical chemistry of proteins, nucleo-proteins, fats; sulfur biochemistry; and the chemical basis of specific immunological reactions, have been but very slightly altered, The newer work of Haworth, Hirst and their co-workers on the structure of normal and reactive sugars have been added to the chapter on carbohydrates, also the more recent work on the rôle of insulin in carbohydrate metabolism. The chapters on the biochemistry of phosphorus, vitamins, hemoglobin and on chemotheraphy have been more or less changed so as to bring them into agreement with the more recent work on the subjects, *e. g.*, vitamin B is divided into B_1 and B_2, B_1 being the anti-neuritic vitamin and B_2 the pellagra-preventing and growth-promoting vitamin, the recent evidence in favor of this differentiation is fully discussed as well as the evidence supporting the possibility that ergosterol is the precursor of vitamin D, the anti-rachitic vitamin.—J. C. FORBES.

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